

Work Hard, Play Hard: Antecedents and Barriers to Decreased Work Ruminations

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Abstract

Psychological detachment occurs in the absence of work ruminations during non-work time and is a vital component in the recovery from work-related fatigue, avoiding burnout, performance decrement and detrimental health-outcomes. Overcommitment to work entails excessive job involvement and resembles poor detachment. Detachment and overcommitment are influenced by characteristics of the worker, their work, and their leisure time, but few studies have examined the effects of work or leisure demands on detachment and overcommitment.

The current study examined the activity demands, detachment and overcommitment ratings of 51 workers and university students by having participants complete nine internet-based surveys over four weeks, and analysing data with a multilevel modelling approach. Rates of psychological detachment were found to be increased by physically demanding leisure activities, and decreased by mentally demanding work activities when leisure activities were mentally undemanding. In addition, detachment rates were higher when work activities were emotionally demanding and leisure activities emotionally undemanding, and when work activities were emotionally undemanding and leisure activities emotionally demanding. Overcommitment was found to be increased by leisure activities which were mentally demanding or emotionally demanding. Work ruminations during leisure time were therefore found to be influenced by work and leisure demands, with the manipulation of leisure demands thereby offering a method through which to diminish or buffer the detrimental impact of arduous work demands on the recovery from fatigue.

Work Hard, Play Hard: Antecedents and Barriers to Decreased Work Ruminations

Psychological Detachment – An Overview

There is an English proverb which states that “a change is as good as a rest”. This phrase, despite its likely age, echoes the sentiment of a construct known as “psychological detachment” by suggesting that an individual can recover from the demands and stresses of work, simply by engaging in some other activity - or indeed, no activity at all.

The construct of psychological detachment from work (‘detachment’) concerns an individual’s ability to disengage mentally and stop thinking about their work during non-work times, regardless of the nature of these thoughts (Demerouti, Bakker, Sonnentag, & Fullagar, 2012; Etzion, Eden, & Lapidot, 1998). An individual who is unable to detach from work demands will remain in a state of high psychological and physiological activation or arousal, which prevents them from commencing recovery processes (Sonnentag, Kuttler, & Fritz, 2010). In addition to obstructing recuperative processes, a lack of psychological detachment represents a second, indirect pathway by which job demands can contribute to, and exacerbate fatigue. With this sustained high level of activation further taxing the fatigued individual’s physical, cognitive, and emotional resources (Geurts & Sonnentag, 2006; Sonnentag & Bayer, 2005).

Before discussing psychological detachment in any depth, it is necessary to first consider the context in which detachment operates. Namely, examining the fatigue, stress and strain which detachment helps to mitigate, the work activities and environments from which workers are attempting to detach, and the leisure (non-work) time during which individuals typically undergo detachment.

Throughout this paper I will often make distinctions between work and non-work (e.g., ‘leisure’ or ‘free’) time. In truth, the distinction between work and non-work ‘time’ is

becoming blurred for many individuals and organisations as a result of ‘boundary-less’ working arrangements. Boundary-less working can entail flexible or non-traditional practices and arrangements concerning the location and times of work, work content and processes, organisational structure, and career trajectories (Allvin, Aronsson, Hagström, Johansson, & Lundberg, 2011; Cooper, Dewe, & O'Driscoll, 2001; Lazarus, 1993). However, I persist in making this work/non-work time distinction as it facilitates easier discussion of various topics (such as activity demands and recovery), and also because the majority of individuals are still engaged in traditional ‘boundaried’ work (Allvin, et al., 2011).

Work-Related Fatigue

In response to the normal physical and mental demands of work activities, an individual experiences physiological and psychological reactions which are ordinarily reversible. However following excessive or extended activity-demands recovery is delayed substantially and fatigue occurs (Grandjean, 1985). If this imbalance between stressors and recuperative factors continues for an extended period of time the health and well-being of the individual can be adversely impacted (Sonnentag, 2001).

Fatigue involves a loss of efficiency and a disinclination towards effort and activity, and arises as the result of substantial physical, mental, or emotional demands which deplete or excessively strain an individual's finite resources (Grandjean, 1985; Lewis & Wessely, 1992). Characterised as an overpowering sensation of weariness which leads to decreased motivation and activity, fatigue serves a signalling function much like that of thirst or hunger, informing the individual that rest and recovery is required (Grandjean, 1985). Fatigue includes cognitive, behavioural and emotional effects which operate as a protective function, coaxing the individual to avoid further strain or exertion, and to relax and commence recovery (Byström, Hanse, & Kjellberg, 2004).

Symptoms and outcomes of fatigue.

The onset of fatigue leads to a rapid, steady decline in both the capacity and rapidity/speed of performance (i.e., the fatigued individual's performance decreases in terms of quality and quantity), and has detrimental effects on alertness, coordination (both mental and physical), error-avoidance, and motivation (Grandjean, 1985). Fatigue also typically results in feelings of weakness and sleepiness, and reduced motor, cognitive and perceptual performance. With the result of these effects being a significant decrement in the regulation and quality of task-oriented behaviours and a general decline in job performance (Grandjean, 1985). Work-related fatigue often manifests as post-work irritability, which many experience as phonophobia (an aversion to loud noises) and a desire for solitude (Jansen, Kant, & van den Brandt, 2002).

These changes mean that the fatigue-sufferer is no longer able to cope with job demands, and is only able to meet these demands by significantly increasing the mental effort they expend in order to overcome increased psychological resistance (Beurskens et al., 2000). For instance, during the early stages of cognitive fatigue, neurons become less effective, and increasing numbers of neurons must be activated in order to maintain a comparable level of mental performance (Grandjean, 1985). A similar, analogous process occurs in relation to muscle fatigue, in which additional muscle fibres are activated in order to meet performance demands.

Chronic fatigue.

If the stressors which lead to fatigue recur frequently or persistently, chronic fatigue can occur. Chronic fatigue, which differs from chronic fatigue syndrome – a condition in which fatigue occurs and persists in relation to no obvious stressors (Lewis & Wessely, 1992), represents the accumulation of the incidental fatigue which results from episodes of excessive strain and heavy job-demands. This condition is characterised by symptoms which

persist at all times in low-levels, rather than during or following episodes of significant exertion (Grandjean, 1985). The symptoms of chronic fatigue can include increased irritability, depression, a predisposition towards illness, headaches, excessive sweating, dizziness, difficulty sleeping, digestive problems and loss of appetite, low blood pressure, build-up of fatty tissue (adipose), and consistently decreased drive and willingness to work (Grandjean, 1985; Jansen, et al., 2002; Lewis & Wessely, 1992).

Those individuals suffering from chronic fatigue are at a dramatically increased risk of succumbing to a condition known as Allostatic Load (von Thiele, Lindfors, & Lundberg, 2006). Allostatis refers to the body's mechanism for coping with changing or adverse conditions by adjusting the body's regulatory systems to maintain homeostasis. Given limited exposure to adverse conditions, or periods of adversity which are heavily interspersed with regular recuperative periods allostasis is an adaptive and protective process (Allvin, et al., 2011; McEwen, 1998). However, in the absence of regular recuperative periods, allostatic processes can become overloaded and malfunction, a condition referred to as 'allostatic load' (AL). AL has been linked to changes in the body which cause diseases such as Atherosclerosis, type-2 Diabetes (McEwen & Seeman, 1999), autoimmune disorders, allergic disorders (Geurts & Sonnentag, 2006), asthma, arthritis, emphysema, and anaemia (Lewis & Wessely, 1992).

While the impact of fatigue on the individual can clearly be extremely severe, the impact of fatigued employees can also be seriously problematic for their employer. Poorly managed or unaddressed worker fatigue can lead to dramatically increased accident rates and severity, increased sickness-related absences and absence duration, and a marked decrease in worker morale, productivity and quality of work (de Croon, Sluiter, & Frings-Dresen, 2003; Leitner & Leitner, 2012).

Fatigue in the population.

Rather than being a discrete condition which one either is or is not experiencing, fatigue represents a continuum upon which individuals lie, with almost all individuals experiencing some level of fatigue at any given time. For instance, the 1987 United States General Social Survey found 78% of women and 73% of men surveyed to have experienced some degree of fatigue (Lewis & Wessely, 1992). This result is confirmed by a number of studies which have observed some level of fatigue in the vast majority of participants (Jansen, et al., 2002). In terms of substantial fatigue, a study by Pawlikowska and colleagues (1994) found that of the 15,283 British individuals surveyed, 2,798 (18%) reported that they were experiencing substantial chronic fatigue which had lasted for at least six months, and 2,420 (16.9%) indicated that they were experiencing strong fatigue symptoms at least half of the time. Similarly, a survey of Australian long-distance truck-drivers found that 346 of the 989 (35%) drivers sampled perceived fatigue as a worrisome personal problem (Feyer & Williamson, 1995).

Work as a Cause of Fatigue

Performing in the workplace requires the worker to commit effort and resources which are expended and become depleted as work performance occurs, leading to the onset of fatigue (Grandjean, 1985). In many cases, this fatigue is only momentary as the worker is able to switch to a different activity or task which utilises resources other than those depleted by the previous activity, thereby permitting recovery processes to occur. However this is not always possible and sometimes particular demanding work activities must be sustained for an extended duration (Grandjean, 1985; van Hooff, Geurts, Beckers, & Kompier, 2011). As an example of significant work demands, both psychological (i.e., tenseness, tiredness and irritation) and physiological (i.e., neuroendocrine and cardiovascular indices) signs of strain and distress are frequently observed in response to work tasks which entail high time-

pressure, frequent repetition, physical discomfort, or are perceived as underutilising an individual's skills (Lundberg, Granqvist, Hansson, Magnusson, & Wallin, 1989).

Demand control theory (Karasek, 1979) suggests that the detrimental effects of an individual's job demands (relative to the time and resources available) are moderated by their level of job control or decision-making latitude (Sonnetag & Zijlstra, 2006). Specifically, a worker who is subject to high job demands and has low job control will experience the highest levels of psychological strain and distress, leading to increased levels of anxiety and fatigue, and a greater likelihood of depression (Totterdell, Wood, & Wall, 2006), along with physical illness (Sparks & Cooper, 1999). Furthermore, this moderation relationship is influenced by the worker's trait optimism (i.e., the extent to which they expect generally positive outcomes), with pessimistic (i.e., low-optimism) workers demonstrating the worst and most persistent strain-related symptoms and outcomes (Totterdell, et al., 2006).

Work activities which the worker considers to be pleasurable or enjoyable tend to be associated with lower levels of fatigue and a diminished need for recovery (van Hooff, et al., 2011). With these intrinsically motivating work activities activating the brain's 'pleasure reward' system, triggering the release of dopamine and serotonin, helping to decrease arousal/activation and thereby decreasing the level of perceived stress. Conversely, activities which the individual regards as extremely unpleasant will lead to much higher levels of fatigue (and greatly diminished recovery) than an activity to which the individual is ambivalent (van Hooff, et al., 2011).

As mentioned previously, it is possible for recovery processes to occur during work-time, provided that exhausted resources are no longer taxed. This process is referred to as 'internal recovery', while recovery processes that occur during non-work time are known as 'external recovery'. Internal recovery typically occurs when the individual is able to abstain from activities which demand the depleted resources and is able to focus their attention on

some other task, or abstain from thinking about the stressors which lead to resource depletion (Geurts & Sonnentag, 2006).

Emotional labour at work.

In addition to the physical and mental demands experienced by workers, many jobs require the worker to manipulate their displayed emotions in some way – often referred to as emotional labour (Grandey, 2000; Leidner, 1999). Emotional labour might include suppressing or exaggerating genuinely felt emotions, or ‘faking’ emotions which the worker does not genuinely feel, in order to convey a particular mood or demeanour to those interacting with the employee (Ashkanasy & Humphrey, 2011; Grandey, 2000; van Gelderen, Bakker, Konijn, & Demerouti, 2011). Examples of these sorts of jobs might include a customer service worker who must exude happiness and friendliness, a police officer who must remain calm and stern, or a hospice worker who must not show their sadness at the plight of their patients.

The requirement for emotional labour in a particular job might be espoused in formal materials (such as position descriptions, training materials, and organisational mission statements), or be part of cultural and societal norms and expectations. Emotional labour requirements may relate to the worker’s interactions with customers and clients, suppliers and contractors, and even other members of the organisation (Ashkanasy & Humphrey, 2011; Grandey, 2000; van Gelderen, et al., 2011). Emotional labour is typically performed in order to increase the effectiveness of the worker’s interpersonal interactions, and ultimately the outcomes of their work. Though in many cases (particularly those pertaining to service work) emotional labour occurs simply as the result of an organisation’s espoused “display rules” (Leidner, 1999). Emotional labour occurs on one of two levels; ‘surface-acting’ concerns the suppression or exaggeration of felt emotions, or faking of unfelt emotions, while ‘deep-

acting' entails consciously attempting to modify one's feelings – essentially convincing oneself that a particular feeling or attitude is indeed genuine (Grandey, 2000; Leidner, 1999).

Much like physical or cognitive demands, emotional demands exert strain on the labouring individual, and when an individual is subject to repeated or prolonged episodes of emotional labour then emotional exhaustion, depersonalisation, stress and burnout can result (Brotheridge & Grandey, 2002; Grandey, 2000). In addition to the usual reactions to fatigue, the faking of emotions leads to a situation of emotional dissonance which not only increases cognitive demands, but has detrimental effects on the worker's social interactions, memory encoding and recall, and affective well-being (Ashkanasy & Humphrey, 2011; Kruml & Geddes, 2000; van Gelderen, et al., 2011; Zapf, 2002). Surface-level acting is generally more detrimental to employee well-being and has been associated with depersonalisation; experiencing a detached attitude towards others and the sensation of being detached from one's self and environment (Hunter, Phillips, Sierra, & David, 2003; Simeon, 2004). Conversely, deep-level acting has been associated with increased work-related self-efficacy, increased sense of personal accomplishment, and more favourable reactions from interaction partners such as customers and co-workers (Ashkanasy & Humphrey, 2011; Brotheridge & Grandey, 2002).

However, even if a job does require an employee to convey a particular demeanour or persona, this might not require suppressing or faking emotions. For instance, a shop assistant whose job requires being warm and pleasant towards customers may genuinely enjoy the fleeting, superficial interactions they hold with customers (Ashkanasy & Humphrey, 2011). It is the dissonance between felt and displayed emotions which causes emotional labour to be demanding (Bakker & Heuven, 2006; Kruml & Geddes, 2000; Zapf, 2002). On the contrary, the display of genuine positive emotions (such as contentment and amusement) have been observed to expedite the recovery from the detrimental cardiovascular effects of negative

emotions (e.g., stress, anxiety, fear and sadness) such as elevated blood pressure and heart-rate, and prolonged vasoconstriction (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000).

The proportion of jobs which involve emotional labour is steadily increasing with the proliferation of service work, and the decline in manufacturing and agricultural work resulting from improved automation technologies (Leidner, 1999). Though not all service work requires emotional labour, nor is manufacturing work necessarily absent of emotional labour demands, as the ‘essence’ of emotional labour is the intention to induce a particular state of mind in another person (Leidner, 1999).

Work context and fatigue.

In addition to the demands of work activities, many characteristics of the workplace can be detrimental to an employee’s well-being. For instance, a work environment which is perceived as excessively noisy, dangerous, dirty or socially unpleasant can lead to psychological distress, psychosomatic illness, and detrimental physiological changes (Klitzman, House, Israel, & Mero, 1990; Sparks & Cooper, 1999). Furthermore, issues of low job-security, non-existent career development, and pending performance appraisals are all major sources of job-related stress (Sparks & Cooper, 1999).

Characteristics intrinsic to a particular position can greatly influence stress and strain reactions – hours of work and overtime, role ambiguity, role conflict, work overload, and the introduction of new technology into the individual’s work processes (Byström, et al., 2004; Jansen, et al., 2002; Mellor, Karanika-Murray, & Waite, 2012; Sparks & Cooper, 1999; van Hooff, et al., 2011). Finally, work-place social relationships, such as those with supervisors, co-workers, clients, and subordinates, can provide a source of support for the individual. However they can also cause additional stress if conflict is occurring or a relationship is not

functioning as the individual desires (Byström, et al., 2004; Mellor, et al., 2012; Sparks & Cooper, 1999).

Strain reactions occur not simply as the result of the work tasks and environment, nor due to the characteristics of the individual, but rather they arise in response to an interaction between the two (Brotheridge & Grandey, 2002; Mellor, et al., 2012). For instance, an individual might determine that meeting a particular demand (e.g., performing an activity or merely enduring or tolerating some work activity or condition) is important to them for either intrinsic or extrinsic reasons. This individual might then recognise that despite this strong desire to achieve, they lack the resources, competencies or coping mechanisms to do so – resulting in the perception of stress or anxiety (Dewe, 1992; Sanders, 1983). This negative reaction is strongest when the individual regards themselves as having little to no control over the demand – that is, even though they don't believe they can meet the demand, they must still try (Karasek, 1979; Le Fevre, Matheny, & Kolt, 2003).

Tertiary study as a form of work.

While the vast majority of stress and fatigue research considers only those engaged in either volunteer or paid work, much of this research can also be applied to university students. Much of the work performed by students can be considered demanding – writing reports and papers, sitting exams, and delivering presentations to groups of their peers and instructors are all likely to elicit feelings of anxiety and stress from students (Leitner & Leitner, 2012). For some, this stress will be motivating and increase the student's engagement with their work ('eustress') while for others this stress can be debilitating ('distress') and detrimental to both academic performance and well-being (Le Fevre, et al., 2003; Leitner & Leitner, 2012).

To demonstrate the perceived demands of student activities, a recent survey of North American college (university) students showed that 52% of respondents indicated that they

had experienced high levels of stress during the college semester. In addition, 27% of students indicated that they felt frequently overwhelmed by the various requirements of tertiary study, with this proportion increasing to 30% when only first-year ('freshmen') students were considered (Leitner & Leitner, 2012).

The Recuperative Role of Leisure

Work-related fatigue arises primarily as the result of an imbalance between stressing and recuperative factors which occur during the work-day (Grandjean, 1985). Therefore, in many cases fatigue can be prevented, or recovered from, simply by taking a break from whatever demanding task happens to be draining the individual's resources. However it is often not possible to take a break from particular activities during the work day, and the individual must instead rely upon their non-work (leisure) time to fulfil their recuperative needs. Leisure activities thereby represent an emotion-focused coping mechanism (Lazarus, 1993) which provides an 'escape' from work demands rather than helping the individual to change or diminish work demands (i.e., a problem-focused approach) (Trenberth & Dewe, 2002). This 'escape' from work demands provides the worker with the chance to recover resources lost in the course of work performance, and even demanding leisure activities can provide a recuperative function provided that they do not continue to tax those resources already depleted by work activities (Fritz, Sonnentag, Spector, & McInroe, 2010).

The activities with which an individual occupies their leisure time can greatly influence their ability to recover from fatigue. Respite activities which entail low social, mental or physical demands tend to have beneficial effects on wellbeing, affectivity, and recovery from fatigue (Fritz, et al., 2010; Sonnentag, 2001; Trougakos, Beal, Green, & Weiss, 2008). Examples of these low-demand respite activities include taking a walk, reading a magazine, or chatting with friends. This type of respite activity has been linked to increased work-engagement and pursuit of learning opportunities during the subsequent work week

(Fritz & Sonnentag, 2005). In contrast to this, work-related and household activities (e.g., cleaning and childcare) have been found to have a detrimental impact on recovery processes (Sonnentag, 2001), due to the obligatory nature of these activities (Karasek, 1979) and the fact that they typically occur when the individual is already fatigued, thereby further depleting already drained resources (Fritz, et al., 2010; Sonnentag, 2001).

Overall, it does not appear to matter whether an individual's leisure activities are perceived as demanding or difficult provided that the individual enjoys them. Undertaking enjoyable or intrinsically motivating activities leads to pleasure responses (i.e., release of dopamine and serotonin) which facilitate rapid recovery from fatigue, stress and exhaustion (Tucker, Dahlgren, Akerstedt, & Waterhouse, 2008; van Hooff, et al., 2011). For example, listening to music can either assist or obstruct the individual in their efforts to recover from work demands, dependent primarily on the listener's musical preferences. While low-tempo, soft music has been repeatedly demonstrate to facilitate relaxation, the recuperative effects of music are strongest when the individual deems the particular music to be pleasant and to their liking (Leitner & Leitner, 2012).

The effect of leisure activity demands.

The demand-control model (Karasek, 1979) explains that work-related demands experienced under conditions of low decision-making latitude cause the strain a worker experiences in relation to their work activities (Totterdell, et al., 2006). When at work, an individual's decision-making latitude is often low and fixed, however this constraint is usually greatly relaxed during leisure time when people are typically permitted to choose for themselves the activities they perform, or even to make the choice to not engage in any meaningful activity (Rybczynski, 1991). For most individuals, their 'free-time' is filled with activities such as hobbies, exercise, housework, and social and family interactions. Much like

work-related activities, leisure activities can entail demands which draw on the individual's resources (Fritz, et al., 2010).

Time away from work typically affords the worker a reduction, or even total absence of the demands which they face during work times (Fritz, et al., 2010). However it is not necessary for leisure activities to entail low demands in order to facilitate recovery. In fact, effortful leisure activities appear to have greater recuperative effects than do passive leisure activities (Tucker, et al., 2008). For instance, mastery experiences involve activities or tasks which typically require some degree of learning and effortful practice in order to obtain proficiency (e.g., learning to bake, play a musical instrument, or speak another language). However despite their active and challenging nature, mastery experiences are consistently observed to positively influence the recovery process (Fritz, et al., 2010; Sonnentag & Fritz, 2007). For instance, a study of secondary school principals and deputy-principals found that active or challenging activities which were able to fully capture the attention and focus of the individual showed far stronger recuperative effects than did undemanding activities (Trenberth & Dewe, 2002).

Physical leisure activity offers an engaging, albeit temporary, distraction from work demands and problems, and serves to activate physiological and psychological mechanisms which increase mood and well-being, helping the individual to recover from the effects of work demands (Sonnentag, 2001). While physically active leisure activities appear to have a faint positive relationship with physical fatigue (van Hooff, et al., 2011), regular physical exercise helps to decrease stress-reactions and fatigue. Causing the release of endorphins, returning blood pressure to a healthy range, relaxing muscles, and decreasing anxiety (Leitner & Leitner, 2012). With regular physically active leisure-time leading to an improvement in general health and well-being (Zuzanek, Robinson, & Iwasaki, 1998). The beneficial effects

of physically active leisure are most apparent when these leisure activities use different resources to those taxed by the individual's work tasks (Sonnentag, 2001).

Leisure activities which entail low mental demands tend to be associated with improved recovery and lower levels of fatigue (Tucker, et al., 2008). Furthermore, when an individual's work entails heavy emotional labour demands, leisure activities which also entail emotional labour (e.g., amateur theatre) can impede or reverse recovery processes (Sonnentag, 2001). This effect is moderated by the degree of self-determination inherent in the activity, with the relationship being suppressed by high degrees of self-determination (Sonnentag, 2001).

Decreased and fragmented leisure time.

Following a sustained downward trend in working hours for those in first-world western countries, which led to an increase in time available for leisure activities, it now appears that the number of hours the average worker spends engaged in work per week is increasing (Allvin, et al., 2011; Zuzanek, 1998; Zuzanek, Beckers, & Peters, 1998). Reasons for this trend reversal include increased competitive pressures as the result of globalisation processes, an increasingly consumption-oriented culture, and the intensification of job requirements following widespread organisational downsizing and improved workplace technologies (Allvin, et al., 2011; Cooper, et al., 2001; Zuzanek, Beckers, et al., 1998). Furthermore, flexible working arrangements, the increased incidence of single-parent households, and an increase in secondary jobs resulting from decreased job security mean that for many individuals, their non-work hours are often fragmented and no longer occur in one or two large 'chunks' per day (Cooper, et al., 2001; Zuzanek, Beckers, et al., 1998; Zuzanek, Robinson, et al., 1998).

Decreased or fragmented leisure time has led many individuals to perceive an increase in time-pressure which results in elevated stress levels in the general population (Allvin, et

al., 2011). Decreased and fragmented leisure time also has the effect of limiting an individual's access to leisure activities and resources. The outcome of these two effects is that individuals are more stressed than they had previously been, and their life satisfaction and perceived quality of life is now much lower (Zuzanek, 1998)

Finally, much of the existent research focuses on weekend and vacation-based recovery, which might not necessarily apply to those experiencing fragmented leisure or who lack regular vacations (e.g., university students who work throughout the term, semester, and summer holidays). However recovery processes can occur during the non-work time an individual experiences after their work is done for the day. In particular, daily recovery from work demands leads to increased work engagement on the following day, which in turn leads to increased incidences of proactive behaviours such as pursuing learning and development opportunities, and taking personal initiative (Sonnentag, 2003).

Psychological Detachment from Work

Detachment serves a crucial role in the recovery from fatigue, permitting the individual to cognitively 'get away' from the demands of their work (Etzion, et al., 1998; Fritz, et al., 2010). Unlike many other emotion-focused coping techniques, which function by changing the individual's appraisal of a particular stressor, detachment functions by avoidance of work-related thoughts, and is therefore a temporary process (Lazarus, 1993). Experiencing detachment during the work week tends to reduce negative affect, while detachment during weekends and vacations tends to increase positive affect (Fritz, et al., 2010). This suggests that weekday-detachment entails temporarily forgetting the demands and negative aspects of work, while weekend-detachment involves becoming engaged in activities which distract the individual and facilitate recovery from fatigue (Fritz, et al., 2010). Supporting the proposition that engagement in certain activities facilitates recovery, one study (Etzion, et al., 1998) found that even the challenging and resource-demanding role

of reservist military service had beneficial, respite-like effects for non-military engineers and technicians who had previously been diagnosed as suffering from burnout. Importantly, the recuperative effects of reserve service were strongest for those reporting the highest levels of psychological detachment from work (Etzion, et al., 1998). Furthermore, in addition to its recuperative effects, psychological detachment serves to weaken the effect of workplace bullying on both work-related strain, and role conflict, with high levels of psychological detachment essentially buffering the negative effects of workplace bullying (Moreno-Jiménez, Rodríguez-Muñoz, Pastor, Sanz-Vergel, & Garrosa, 2009).

Failure to detach from work in the evenings can inhibit the individual's ability to fall and stay asleep. With the resultant insomnia or fitful sleep serving to compound fatigue, requiring the individual to allocate even more resources in order to maintain functioning and job performance during the following day (Tucker, et al., 2008). Leisure-time work-ruminations which concern stressful or unpleasant events at work were found to prolong the stress symptoms which arose in response to the original stressful event (McCullough, Orsulak, Brandon, & Akers, 2007). Work-related ruminations were also found to prevent the occurrence of positive emotions which would ordinarily serve to expedite the recovery from negative emotions arising in response to a stressful event or interpersonal encounter (McCullough, Bono, & Root, 2007).

Individual and work-related antecedents to detachment.

Interpersonal differences exist with regards to how well individuals are able to detach from their work. The individual's work philosophy greatly influences their ability to detach, with those exhibiting high levels of affective commitment demonstrating worse detachment than those who demonstrate low affective and high continuance commitment (Cropley & Millward, 2009; Meyer & Allen, 1991). Likewise, work which is extrinsically motivating appears more easily detached from than intrinsically motivating work activities (Cropley &

Millward, 2009). The individual's strategies for coping with work-related ruminations and intrusive thoughts can influence detachment, as too can the previously-experienced outcomes of these coping-strategies, such as the perceived degree of work-family and family-work conflict (Cropley & Millward, 2009). The individual's tendency towards thoughtfulness or rumination also influences detachment, with high-ruminators often perceiving an 'overlap' (i.e., blurred boundaries) between work and leisure which leads them to spend considerable time thinking about work during leisure time. Low-ruminators however tend to view work and leisure contexts as discrete and develop strategies to facilitate detachment and 'unwinding' from work (Cropley & Millward, 2009).

Despite interpersonal differences in detachment tendencies, methods for increasing detachment efficacy can be taught and practiced with observable success. A training programme was implemented in Germany to educate employees from five large organisations on effective methods for decreasing work-related worry, and 'segmentation tactics' to assist in the establishment and maintenance of work-home boundaries (Hahn, Binnewies, Sonnentag, & Monjza, 2011). Participants of the programme were found to have significantly increased levels of psychological detachment immediately following completion of the training, and at one and three weeks after the programme's completion (Hahn, et al., 2011)

Characteristics of the individual's work can also influence their ability to psychologically detach during leisure time. Individuals who perceive themselves as being subject to a particularly heavy workload, relative to the time and resources available and their own abilities, will experience difficulty detaching (Sonnentag & Bayer, 2005; Sonnentag, et al., 2010). For instance, New Zealand secondary school teachers who reported high-workloads and emotional labour demands took longer to detach from work in the evenings than did their colleagues who reported lower levels of job strain (Cropley, Dijk, & Stanley, 2006). Work which is particularly challenging, involves high time-pressure, or includes tasks

and responsibilities which cause emotional dissonance will increase the difficulty of detaching (Sonnentag & Bayer, 2005; Sonnentag, et al., 2010). In addition, those individuals who perceive their work-home boundaries to be highly permeable (e.g., those who work from home, or work with their spouse) are likely to experience very low levels of psychological detachment (Sonnentag, et al., 2010).

Positive work reflections.

While psychological detachment from work is inarguably beneficial to recovery processes (Fritz, et al., 2010; Sonnentag & Fritz, 2007; Sonnentag, et al., 2010), positive work-ruminations can also lead to improved recovery outcomes for the individual (van Hooff, et al., 2011). Positive work reflections, which consist of positive reflective appraisals of work activities, experiences and demands, lead to decreased instances of burnout and increased energy levels when recommencing work (Fritz & Sonnentag, 2005). Positive reflections can involve global considerations of work (i.e., pertaining to the job or organisation in general), specific activities or job-factors, or even personal factors (i.e., job-related self-efficacy). In addition to work-reflections, these positive ruminations can also involve the positive reframing of previously negative situations, and the development or extension of goals and goal attainment strategies (Fritz & Sonnentag, 2005; van Hooff, et al., 2011).

Overcommitment to work: antithesis to detachment.

Overcommitment is similar to a condition of low psychological detachment and refers to a tendency towards excessive job involvement which causes prolonged periods of activation (Joksimovic, Starke, Knesebeck, & Siegrist, 2002). Overcommitment is characterised by a tendency to underestimate task demands, and overestimate coping abilities which leads an individual to allocate excessive personal resources (excessive given the value of the possible outcomes), often to the detriment of the individual's well-being (Feuerhahn,

Kühnel, & Kudielka, 2012; Joksimovic, et al., 2002; Preckel, Känel, Kudielka, & Fisher, 2005). These resources can often include cognitive and emotional faculties, in the form of work-related thoughts during the individual's non-work times.

The over-allocation of resources which characterises overcommitment leads to a diminished ability to recover from fatigue (Preckel, et al., 2005) and decreased sleep duration and quality (Kudielka, von Känel, Gander, & Fisher, 2004). Both decreased sleeping ability and inability to recover then serve to exacerbate the detrimental impact of overcommitment on the individual. Overcommitment is associated with negative affectivity, excessive fatigue symptoms, increased irritability and predisposition towards depression, demoralisation, musculoskeletal pain, and an increased risk of cardiac disease and heart-attack (Joksimovic, et al., 2002; Preckel, et al., 2005; Vrijkotte, van Doornen, & de Geus, 2004).

Current Study

Most of the research which has examined psychological detachment was concerned with the effects of individual and job characteristics on the occurrence and extent of psychological detachment. Few of these studies consider the effect of specific work-demands (e.g., physical activity) on detachment, and even fewer considered the effect of specific leisure demands on detachment. None of the reviewed articles considered whether leisure activity demands might serve to moderate the effect of work activity demands on detachment. Nor do any of the existent studies appear to address the effect of work and leisure demands on overcommitment to work, or the moderating effect of leisure demands on the relationship between work demands and overcommitment to work.

This study attempts to address these gaps in knowledge, examining how psychological detachment from work and overcommitment to work are influenced by the physical, cognitive and emotional demands of the activities in which an individual engages during their work and leisure time, and how work and leisure demands might interact to

influence detachment. Also, in addition to considering the psychological detachment of individuals from their work activities, the current study considers the psychological detachment of university students from their study activities.

Hypotheses

Based upon information presented in this study's literature review, a number of research hypotheses were developed:

1. Overcommitment to work will be associated with a decrease in psychological detachment from work (i.e., overcommitment and detachment will be negatively correlated)
2. Leisure activity demands will moderate the relationship between work demands and psychological detachment from work
 - a. Leisure demands which are similar to work demands will be associated with lower levels of detachment
 - b. High physical leisure demands will suppress the relationship between mental and emotional work demands, and detachment
 - c. Low mental or emotional leisure demands will suppress the relationship between physical work demands and detachment
3. Leisure activity demands will moderate the relationship between work demands and overcommitment to work
 - a. Leisure demands which are similar to work demands will be associated with higher levels of overcommitment
 - b. High physical leisure demands will suppress the relationship between mental and emotional work demands, and overcommitment
 - c. Low mental or emotional leisure demands will suppress the relationship between physical work demands and overcommitment

Method

Study Design

The current study employed a within-participants repeated measures design involving nine sampling events across four weeks. The independent variables included the time spent engaged in sleep, work, study, and leisure activities, and participant ratings of the physical, mental and emotional demands of work, study and leisure activities. Dependent variables were participant ratings of psychological detachment from work, and overcommitment to work.

The first measurement occasion consisted of obtaining participant consent, along with completing an internet-based baseline survey. The survey gathered demographic details and had participants estimate their average weekly duration of sleep, work, study, and leisure activities along with their general psychological detachment from work and overcommitment to work. In order to ensure consistency across participants, these initial measurement sessions took place only on Tuesdays, and all sessions occurred in the same office at the University of Canterbury, with only one participant being involved in each session.

The remaining eight measurement occasions all entailed having participants remotely complete an internet-based diary survey. To ensure consistency in the intervals between measurement occasions, diary surveys were administered automatically on Thursdays and Sundays between the hours of 6:00 p.m. and 11:30 p.m. for four weeks after the first measurement occasion, and the Qualtrics survey system was set to only allow access to surveys during this time. Participants were sent the link for each diary survey at 6:00 p.m. on the day of the measurement, with survey links being transmitted to all participants via both e-mail and short message service (SMS) text message. Both the e-mail and SMS messages served also to remind participants of the need to complete the survey, and reiterated that

surveys needed to be completed by 11:30 p.m. *Figure 1* provides a diagrammatic representation of the measurement process employed by this study.

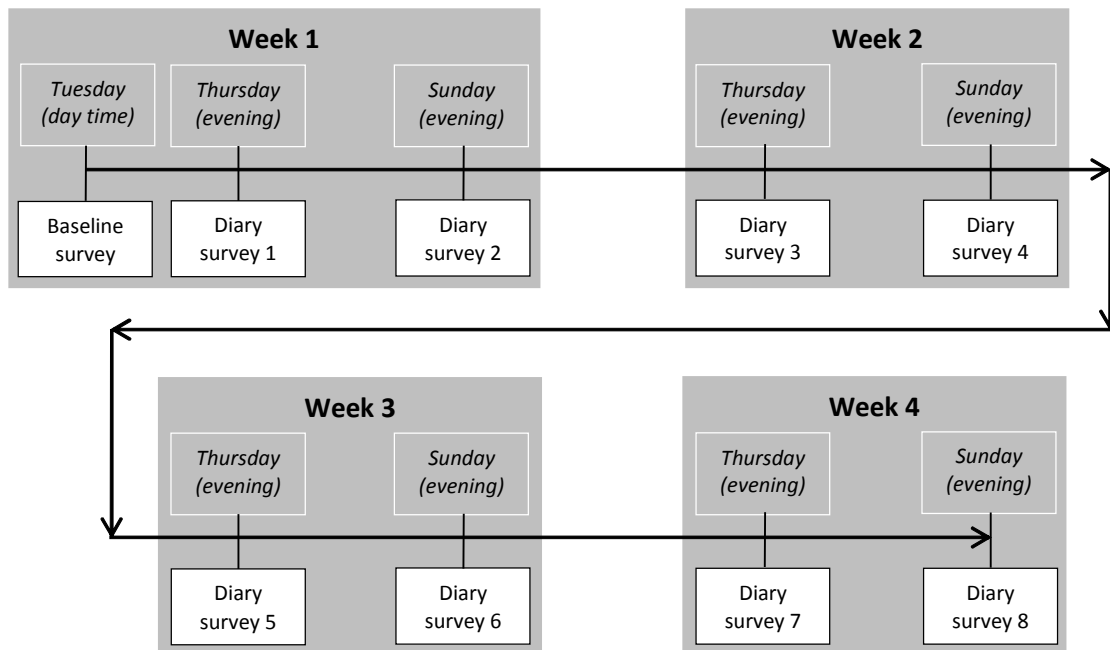


Figure 1. Four week timeline of the current study's measurement process

Sampling Method and Participants

Participants were recruited via a number of methods which included A4-sized posters placed on notice boards in buildings within the University of Canterbury's Ilam and Dovedale campuses (see Appendix A); notices placed on a Facebook® group page maintained by the University of Canterbury's Psychology social group ('UCPsyc') intended for the purposes of recruiting psychological research participants at the University of Canterbury (see Appendix B); a notice placed on the Canterbury District Health Board's (CDHB) intranet 'post-a-note' page (see Appendix B); or via direct communication from either the researcher, his colleagues and classmates, or participants already involved in the study. The yield of participants from each of these recruitment channels is displayed in Table 1, with the posters yielding approximately half of the participants recruited.

Table 1
Number of participants yielded by each recruitment channel.

Recruitment Channel	<i>n</i>	Percentage
On-campus posters	25	49.02
Direct communication	19	37.25
Facebook® page	5	9.80
CDHB intranet	2	3.92

In order to be eligible to participate in the study individuals needed to be either enrolled in tertiary study, engaged in paid work, or both, for the duration of the study's sampling period. This criterion was set as the study considers the relationship between work and non-work demands, therefore a participant needed to have work or study activities to which their non-work activities could be related. All of those who applied to participate met the criteria.

Participants in the study were 51 members of the local Christchurch community, including 15 males and 36 females. The age of participants ranged from 18 to 74 years, with a mean of 27.65 years ($SD = 11.72$). Of the 51 participants, 42 were enrolled as students of the University of Canterbury or University of Otago during the study, with 23 participants studying at an undergraduate level and 19 studying at a postgraduate level. For a more detailed breakdown of the tertiary study status of participants, please refer to Table 2.

Table 2
Tertiary education enrolment status of the current study's participants.

Student status	<i>n</i>	Percentage
Non-student	9	17.65
Undergraduate	23	45.10
Honours	3	5.88
Masters	12	23.53
PhD/Doctorate	4	7.84

The sample was comprised predominantly of New Zealand Europeans ($n = 42$), with a small number of Asian ($n = 6$), and European or North American ($n = 3$) participants also being included. More detailed information regarding the breakdown of participant ethnicity is displayed in Table 3.

Table 3
Ethnicity of the current study's participants.

Ethnicity	n	Percentage
NZ European	42	82.35
Chinese	2	3.92
Korean	1	1.96
Malaysian	2	3.92
Other Asian	1	1.96
European and USA	3	5.77

While participants were strongly urged to complete all eight diary surveys, and reminder messages were sent via e-mail and SMS text message, only 34 of the 51 participants completed all eight diary surveys. With completion rates ranging 3-8 surveys per participant ($M=7.00$, $SD=1.20$), and over 90% of all participants completing at least six of the diary surveys (see Table 4). No participants were excluded for failing to complete surveys.

Table 4
Diary survey completion rates among the current study's participants.

Diary surveys completed	n participants	Percentage	Cumulative Percentage
8 surveys	34	66.67	66.67
7 surveys	6	11.76	78.43
6 surveys	6	11.76	90.20
5 surveys	3	5.88	96.08
4 surveys	1	1.96	98.04
3 surveys	1	1.96	100.00

Materials

Information was gathered from participants using two types of internet-based survey administered via Qualtrics® ‘Research Suite’ survey system. The baseline survey (see Appendix C) was comprised of demographic questions, asking participants to provide information regarding their age, gender, ethnicity, employment status and job title, relationship status, tertiary enrolment status and level of study, whether they lived alone or with others, and their satisfaction with their social relationships. The baseline survey was also intended to provide a retrospective ‘baseline’ measure of the participant’s time usage and psychological detachment from work. To this end it asked participants to consider the previous four weeks and to describe the average amount of hours they had spent per week engaged in work, study, and leisure activities, as well as the time they had spent sleeping. Participants were also asked to evaluate the physical, mental, and emotional demands they experienced during work, study, and leisure activities, and to respond to a four item scale measuring psychological detachment from work during the last four weeks, and a six item scale measuring overcommitment to work during the last four weeks.

The diary survey (see Appendix D) was repeatedly administered and required participants to consider the preceding three days, and to record the amount of time they had spent working, studying, sleeping, and engaged in leisure activities. Participants were asked to rate the extent to which the activities they performed during their work and study, and leisure activities involved physical, mental and emotional demands. In addition the diary survey asked participants to indicate how many hours of physical, mental and emotional demands were encountered as part of their work, study, and leisure activities. The final page of the diary survey contained four items relating to the participant’s degree of psychological detachment from work, and six items concerning their perceived overcommitment to work.

Measures.

Activity Demands.

Each of the diary surveys included 18 items which concerned the frequency of physical, mental, and emotional demands occurring in the activities in which a participant had engaged during the measurement period of the previous three days (see Appendix E). Nine of these items were in relation to the participant's leisure activities, while the remaining nine concerned the work and study activities of the participant.

For both activity domains (i.e., work and study, and leisure activities) three items addressed physical demands (e.g., "...required considerable physical effort on my part"; "...involved sustained physical demands"; "...physically taxed or strained me"), three items addressed mental demands (e.g., "...required considerable mental effort on my part"; "...involved sustained mental demands"; "...mentally taxed or strained me"), and three items addressed emotional regulation demands (e.g., "...required me to conceal my thoughts and feelings"; "...required me to display emotions which I did not genuinely feel"; "...required me to carefully monitor and control my emotions when interacting with other people"). While the nine leisure demand items were presented for all participants, the nine work and study activity items were only presented if the participant had indicated that they had spent at least one hour working or studying during the measurement period.

These 18 items were developed for the purposes of this study after no pre-existing measures were found which would meet the information-gathering requirements of the current study, whilst being brief enough to be appropriate for repeated-administration. Items were developed in discussion between the author and his two supervisors, and usability testing was performed with seven pilot participants to ensure interpretability of the items. None of the pilot participants reported any difficulty in understanding the items, and reported interpretations of the items which were very similar to that of the authors.

Ratings for all 18 items were performed using a 7-point rating scale, with scale points of '1' anchored as "Not at all", '4' anchored as "Occasionally", and '7' anchored as "Frequently". An odd number of scale points was chosen as it would allow participants who were uncertain about the approximate frequency of activity demands to choose a 'mid-point' without incorrectly skewing the distribution of ratings. A 7-point scale was used as it was felt that this would help to mitigate the effects of central tendency bias when compared with a 5-point scale, thereby improving precision of the data without dramatically increasing the difficulty of choosing a response, such as might be encountered with a 9-point scale.

Activity demand subscales.

Exploratory factor analysis (EFA) was performed on the activity-demand items from each activity domain (i.e., work and leisure) to determine whether these demand items represented three distinct constructs (physical, mental, and emotional activity demands) as intended. Bartlett's test for sphericity was significant for all eight diary surveys across both work and study, and leisure activity domains (see Appendix E), suggesting that the correlation matrix underlying the variables is not an identity matrix, and that items are factorable. In addition, Kaiser-Meyer-Olkin values range from .67 to .76 for the work and study demand items, and from .69 to .80 for the leisure demand items (see Appendix E). Given that these values are all greater than .50, this suggests that for all diary surveys and activity domains the partial correlations among the activity demand items are small enough to ensure that each of the samples are of sufficient size to permit exploratory factor analysis. This is of particular importance given that the size of the sample afforded by each diary survey (as listed in Table 6) is quite small relative to the number of demand items being evaluated per activity type (i.e., nine items).

Given that the demand items appear approximately normally distributed, EFA was conducted using the maximum likelihood fitting procedure, with activity domains (work and

study, and leisure) being analysed separately. This procedure identified a three-factor structure for the work and study demand items and the leisure demand items when factor extraction was based upon the Kaiser criterion (i.e., extracting factors with eigenvalues greater than 1) and the Cattell (1966) scree test (see Table 5). The three factors together reproduce 79.39% of the variance observed in the work and study demand items, and 83.80% of the variance observed in the leisure demand items. This three factor structure was found to replicate across the eight diary surveys (see Appendix E), with models reproducing 79.39 to 86.94% of the variance observed in the work and study demand items, and 80.02 to 89.50% of the variance observed in the leisure demand items.

After performing oblique (direct oblimin) rotation of factor loadings, a consistent pattern of factor loadings was observed across all diary surveys and both demand contexts (see Appendix E). Table 5 displays the factor loadings for the first diary survey's work and study, and leisure demand items. Given the consistent item-factor loading pattern, the three factors can be readily interpreted as relating to physical, mental, and emotional demands for both work and study, and leisure demand contexts.

The correlations between each of the three demand factors varies across diary surveys, with correlations ranging from $r = -.10$ to $.62$ for the work and study demand factors, and $r = -.56$ to $.49$ for the leisure demand items (see Appendix E). While no obvious trends in correlations are observed in the work and study demand factors, the leisure emotional demand and physical demand factors are observed to correlate $r > .340$ in five of the diary surveys ($p < .05$).

Table 5

Oblique factor loadings of activity demand items for the first diary survey.

Demand Item	Work and study demand items			Leisure demand items		
	Physical	Mental	Emotional	Physical	Mental	Emotional
ActDem01	.89		.43	.91		
ActDem02	.99			.96		
ActDem03	.72			.90		
ActDem04		.95		.46	-.82	
ActDem05		.95			-.95	
ActDem06		.92			-.90	
ActDem07			.86		-.43	.92
ActDem08			.83			.89
ActDem09			.85			.93
Eigenvalue	2.68	2.98	1.49	3.80	2.43	1.31

Note. Factors based upon maximum likelihood extraction with direct oblimin rotation (see Appendix E for factor loadings of subsequent diary surveys). Factor loadings below .400 are not displayed.

As the factor structure and loading pattern was consistent across measurement occasions, it is appropriate to interpret participant ratings of activity demands at the factor level. Due to the small sample size, demand subscale (i.e., factor) scores were not weighted by factor loadings, and were instead calculated as the mean of the three component items. For example, the ‘leisure physical demand’ score is computed as the mean of leisure demand items 1, 2, and 3. Mean subscale scores for the work and study domain range $M=2.26$ to 4.88 ($SD=1.35$ to 1.75), while the mean subscale scores for the leisure activity domain range $M=2.81$ to 3.16 ($SD=1.40$ to 1.66) (see Table 6).

Table 6

Summary statistics of activity demand scores for each diary survey, by activity domain.

	Demand Subscale		Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6	Diary 7	Diary 8
Work & Study demands		<i>n</i>	46	46	47	36	40	38	40	39
	Physical	<i>M</i>	2.59	2.33	2.12	2.45	2.15	2.22	2.07	2.12
		<i>SD</i>	1.51	1.49	1.32	1.55	1.26	1.28	1.11	1.25
	Mental	<i>M</i>	5.29	4.50	5.24	4.69	5.18	4.55	5.02	4.45
		<i>SD</i>	1.53	1.84	1.65	1.66	1.54	1.74	1.76	1.72
	Emotional	<i>M</i>	3.30	3.33	3.27	3.38	3.43	3.33	3.31	3.16
		<i>SD</i>	1.65	1.78	1.82	1.65	1.71	1.79	1.92	1.79
Leisure demands		<i>n</i>	49	51	50	46	43	46	43	44
	Physical	<i>M</i>	3.14	3.39	3.14	3.21	2.82	3.38	3.12	2.95
		<i>SD</i>	1.62	1.63	1.57	1.80	1.66	2.01	1.57	1.37
	Mental	<i>M</i>	3.14	2.78	2.72	3.14	2.65	2.72	2.62	2.69
		<i>SD</i>	1.40	1.32	1.36	1.73	1.35	1.37	1.06	1.55
	Emotional	<i>M</i>	2.78	3.00	2.89	2.99	2.95	2.78	2.64	3.16
		<i>SD</i>	1.69	1.77	1.82	1.72	1.68	1.63	1.43	1.87

Note. Range of possible scores is 1 to 7, with higher ratings indicating heavier or more frequent activity demands.

The internal consistency reliabilities of each of the activity demand subscales are good or excellent in all cases, with Cronbach's alpha values ranging $\alpha = .867$ to $.973$ for the work and study subscales, and $\alpha = .856$ -. $.973$ for the leisure subscales (see Table 7).

Table 7
Internal Consistency Reliabilities of the Six Demand Subscales

		Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6	Diary 7	Diary 8
Work & study demand subscale	Physical	.89	.89	.90	.91	.94	.89	.87	.90
	Mental	.95	.95	.96	.89	.94	.95	.95	.94
	Emotional	.88	.93	.93	.95	.96	.96	.97	.97
Leisure demand subscale	Physical	.94	.94	.93	.93	.96	.97	.93	.90
	Mental	.91	.86	.91	.94	.94	.89	.88	.95
	Emotional	.93	.97	.94	.95	.96	.94	.92	.96

Note. Internal consistency was measured using Cronbach's alpha.

Psychological detachment from work.

Both the baseline survey and all eight diary surveys included four items which asked participants to evaluate their perceived psychological detachment from work during their free-time. These survey items were adapted slightly from the 'Psychological Detachment' subscale of the Recovery Experience Questionnaire - REQ (Sonnentag & Fritz, 2007), a self-report measure intended to assess how participants recover from work-related demands, fatigue and stress during their free evenings. The REQ includes 16 items which examine the 'recovery experiences' of respondents in terms of psychological detachment from work (e.g., "I forget about work", "I don't think about work"), relaxation, mastery experiences, and the experience of control or autonomy, with four items pertaining to each construct. Ratings are performed using a 5-point Likert scale, with a rating of 1 anchored as "I do not agree at all" and 5 anchored as "I fully agree" (Sonnetttag & Fritz, 2007). Scores for the REQ-PD are calculated by taking the mean of the four detachment items, with potential scores thereby

ranging from 1 to 5 (Sonnentag & Fritz, 2007). The internal consistency of the REQ's psychological detachment from work subscale (REQ-PD) is consistently found to be very high, with Cronbach's Alpha values ranging $\alpha=.84$ to $.89$ when rated by the individual (Park, Fritz, & Jex, 2011; Sonnentag & Fritz, 2007; Sonnentag, et al., 2010), and $\alpha=.90$ when rated by the individual's spouse, with spousal and self-report ratings being positively related ($r=.52, p<.01$) (Sonnentag, et al., 2010).

The REQ-PD has been demonstrated to correlate negatively with unpleasant working conditions such as time pressure, emotional dissonance and heavy workload, and with manifestations of poor psychological well-being, such as emotional exhaustion, and sleeping problems. The REQ-PD has also been consistently found to correlate positively with manifestations of psychological well-being, such as emotional stability and life satisfaction, as well as with positive affect, such as joviality, self-assurance, and serenity (Fritz, et al., 2010; Sonnentag & Fritz, 2007; Sonnentag, et al., 2010). These relationships with working conditions and psychological outcomes matches with previous definitions of the psychological detachment construct (Etzion, et al., 1998), thereby lending evidence of the construct validity of the REQ-PD.

Alterations to the psychological detachment subscale.

To improve the fit of the detachment items with the current study, each of the four items was altered slightly. This entailed changing the tense of the items to ensure appropriateness for both the baseline and diary surveys. In addition, so that tertiary education activities would be considered as a context from which participants might detach, the word "work" was replaced with the phrase "work and study" for all four items. Examples of the alterations include changing "I don't think about work at all" to "I didn't think about work and study at all", and changing "I distance myself from my work" to "I distanced myself from my work and study" (see Appendix F).

Rather than using the 5-point scale used in the REQ-PD, participants in the current study were required to respond to the four psychological detachment items using a 7-point Likert scale, with a rating of 1 anchored as “Strongly Disagree”, 4 anchored as “Neither Agree nor Disagree”, and 7 anchored as “Strongly Agree”. The 7-point Likert scale was chosen over the REQ-PD’s 5-point scale to provide consistency with the activity demand rating items, and to minimise the effects of central tendency bias.

Exploratory factor analysis of the psychological detachment subscale was conducted using the maximum likelihood method, and consistently led to the extraction of a single-factor based upon the Kaiser criterion (i.e., extraction of factors with eigenvalues greater than 1) and the Cattell (1966) scree test (see Appendix F). The eigenvalue of this factor ranged 2.31 to 2.96 across measurement occasions, with the factor reproducing 57.79 to 73.86% of the variance observed in the four detachment items. The sample size of each measurement occasion are likely to have been sufficient given the partial-correlations between items ($KMO=.662$ to $.797$), and the items appear factorable for all measurement occasions (Bartlett’s $\chi^2(6)=107.93$ to 153.88 , all $p<.001$). Therefore it is appropriate to form a single psychological detachment score by combining the items.

The internal consistency of the current study’s psychological detachment subscale was good, with items from the baseline survey having a Cronbach’s Alpha of $\alpha=.87$, and the diary survey subscales ranging from $\alpha=.85$ to $.92$ (see Table 8). The size of the sample used to evaluate the internal consistency of the scales varies across surveys as not all participants completed all eight diary surveys, leading to sample sizes which range $n=43$ to 51 ($M=47$, $SD=3.32$) across the baseline and diary surveys. Psychological detachment subscale scores were calculated as the un-weighted mean of the four items, resulting in scores which can range from 1 to 7. The mean and dispersion of the current study’s psychological detachment subscale scores are similar across measurement occasions and are located in the middle of the

possible range of scores, with means ranging from $M=3.99$ to 4.84 ($SD=1.44$ to 1.66) across the baseline and eight diary surveys (see Table 8).

Table 8

Internal consistency and summary statistics of the current study's 'psychological detachment from work' subscale.

	Baseline	Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6	Diary 7	Diary 8
<i>n</i>	51	49	51	50	46	43	46	43	44
α	.87	.87	.89	.91	.90	.89	.85	.89	.92
<i>M</i>	4.53	4.53	4.65	3.99	4.61	4.09	4.84	4.05	4.42
<i>SD</i>	1.44	1.46	1.54	1.65	1.60	1.57	1.45	1.55	1.66

Note. Possible item responses range 1 to 7, with higher scores indicating higher degrees of psychological detachment from work.

Overcommitment.

Both the baseline survey and all eight diary surveys included six items which asked participants to evaluate their perceived overcommitment to work. These items were adapted slightly from the overcommitment subscale of a large questionnaire originally constructed to examine the effect of the modern working life (e.g., increased autonomy, flexible or boundary-less working conditions) on employees in Europe (Näswall, Baraldi, Richter, Hellgren, & Sverke, 2006). This same questionnaire was later used in a study investigating the effects of increased job insecurity on the employees of a number of Swedish accounting, and financial consulting and advising companies (Näswall et al., 2010). The overcommitment subscale (Ovc) is intended to evaluate the extent to which work is on an individual's mind during their free (i.e., non-work or leisure) time, regardless of actual work-related intrusions into the individual's free time (Näswall, et al., 2006). The Ovc is comprised of six brief statements against which participants must rate their agreement, examples of statements include "It often occurs that I wake up in the morning and think about work related problems" or "Those who are close to me say I give too much of myself to my work" (see

Appendix G). Item ratings are performed on a 5-point Likert scale, with a rating of '1' anchored as "Disagree" and '5' anchored as "Agree". Scores for the Ovc are calculated by taking the mean of the six items, with the second item ("When I come home, it is easy for me to switch off from work") being reverse-scored. With higher scores thereby associated with greater degrees of overcommitment to work (Näswall, et al., 2006). The scale has demonstrated good internal consistency reliability, with Cronbach's alpha values ranging $\alpha=.88$ to $.91$ across four sample groups and two time-points (i.e., 8 sets of ratings) in the 'modern working life' study (Näswall, et al., 2006), and $\alpha=.90$ to $.91$ across four time-points in the 'job insecurity' study (Näswall, et al., 2010).

Alterations to the overcommitment subscale.

To improve fit with the current study's focus, the tense of the Ovc items was altered for the diary surveys to ensure appropriateness for the measurement period involved. To permit tertiary study activities to be considered as a form of work to which participants might be overcommitted, the word "work" was replaced with the phrase "work or study" for all items in the baseline and diary surveys. In addition, some supplementary changes were made to item wording to increase the readability of the items. Examples of the differences between item versions include "It often occurs that I wake up in the morning and think about work related problems" (original version), "I often think about work or study related problems after waking up" (baseline version), and "I often thought about work or study related problems after waking up" (diary survey); "Those who are close to me say I give too much of myself to my work" (original version), "I believe that those who are closest to me think I give too much of myself to my work or study" (baseline survey), and "I believe that those who are closest to me would think I gave too much of myself to my work or study" (diary survey). Appendix G contains the full list of original, baseline survey, and diary survey items.

Ratings in the current study were performed using a 7-point scale, with a rating of 1 anchored as “Strongly Disagree”, 4 anchored as “Neither Agree nor Disagree”, and 7 anchored as “Strongly Agree”. A 7-point scale was selected to ensure consistency with the activity demand and psychological detachment subscales, and to minimise the impact of central tendency bias.

Exploratory factor analysis of the overcommitment items was conducted using the maximum likelihood method, and consistently lead to the extraction of a single factor based upon the Kaiser criterion (i.e., extraction of factors with eigenvalues larger than 1) and the Cattell (1966) scree test (see Appendix G). The eigenvalue of this factor ranges from 3.07 to 3.99 across measurement occasions, with the factor reproducing 51.09 to 66.51% of the variance observed in the overcommitment items. The sample size of each measurement occasion is adequate given the partial correlations between items ($KMO=.81$ to $.88$), and the items are factorable, being unlikely to represent an identity matrix (Bartlett’s $\chi^2(15)=133.06$ to 220.65 , all $p<.001$). Therefore it is appropriate to form a single overcommitment score by combining the items.

The internal consistency of the overcommitment subscale was good for the baseline survey, and seven of the eight diary surveys, with Cronbach’s alpha values ranging $\alpha=.81$ to $.91$ (see Table 9). However the internal consistency of the subscale was poor for the fourth diary survey, with $\alpha=.59$. The size of the sample used to evaluate the internal consistency of the subscale varies across surveys as not all participants completed all eight diary surveys, with sample sizes ranging $n=43$ to 51 ($M=47$, $SD=3.32$) across measurement occasions (see Table 9). Overcommitment subscale scores were calculated as the un-weighted mean of the six items (Ovc02 being reverse-coded), resulting in scores which range from 1 to 7. The mean and dispersion of overcommitment subscale scores is similar across measurement

occasions and is located at the scale's mid-point, with mean scores ranging from $M=3.79$ to 4.49 ($SD=1.25$ to 1.56) across the baseline and eight diary surveys (see Table 9).

Table 9

Internal consistency and summary statistics of items measuring overcommitment to work.

	Baseline	Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6	Diary 7	Diary 8
<i>n</i>	51	49	51	50	46	43	46	43	44
α	.86	.81	.87	.91	.59	.86	.88	.82	.86
<i>M</i>	4.49	4.22	4.00	4.26	4.03	4.44	3.79	4.25	4.09
<i>SD</i>	1.25	1.44	1.56	1.45	1.35	1.39	1.28	1.38	1.44

Note. Possible item responses range 1-7, with higher scores indicating higher degrees of overcommitment to work.

Procedure

After having e-mailed the researcher in response to recruitment media, participants were inducted into the study by first receiving a brief summary of the study's rationale and activities via e-mail (see Appendix H) and a link to a website which reiterates the contents of the recruitment poster and the summary e-mail, as well as further describing the study in a conversational manner (see Appendix J). Participants were asked to arrange a time to meet with the researcher, during which time the purpose of the study was discussed, participants questions were addressed, and participants were provided with an information sheet which described the study in detail (see Appendix I). After providing their written consent and contact details (see Appendix K), participants were asked to complete the 'baseline' survey using a computer located in the meeting room.

Study participation was rewarded with sweets and chocolates and 15 of the study's participants were further rewarded with \$50 fuel vouchers. These 15 participants were randomly selected from the pool of participants who had completed all components of the study, which included nine surveys and a meeting with the researcher. All participants

provided their written consent prior to commencing the study after having been informed of the study's purpose and activities, and having the opportunity to ask questions.

After completing the baseline survey and meeting with the researcher, participants then began the repeated-measures phase of the study. This involved having participants respond to the diary survey on Thursday and Sunday evenings for the four weeks following completion of the baseline survey, with two surveys per week over four weeks leading to eight sampling sessions per participant during this phase of the study. In order to assist participants in remembering to complete the survey, participants were sent an e-mail containing the URL (internet address) of that day's diary survey, and an SMS containing a shortened version of the survey's URL (see Appendix L). Participants were able to complete the survey from any computer or device capable of browsing the internet. Following the completion of all eight diary surveys, participants were then sent an e-mail to thank them for their continued efforts in responding to surveys (see Appendix M).

Ethics.

The current study, as described in the information sheet (see Appendix I) and recruitment materials (see Appendices A, B, and J), was reviewed and approved by the University of Canterbury's Human Ethics Committee, reference number HEC 2012/96.

Results

Analysis

Testing of hypothesis 1 was performed using Pearson product-moment correlation coefficients to measure the relationship between psychological detachment and overcommitment observed during each measurement occasion. Due to the longitudinal nature of the repeated-measurement diary process, the current study includes time-level data which is nested within participant-level data. Because of this hierarchical structure, testing of hypotheses 2 and 3 was conducted using a multilevel modelling (MLM) approach. MLM is appropriate for this type of nested longitudinal data as it permits partitioning of within-participant (intra-person) and between-participant (inter-person) variance by permitting the slopes and intercepts (respectively) of regression models to vary between participants (Hoffman, 2007; Hoffman & Stawski, 2009). This is preferable to alternative statistical techniques, such as repeated measures analysis of variance or multiple-regression, which would simply aggregate a given participant's responses over time, failing to account for intra-person variation (Bolger, Davis, & Rafaeli, 2003; Hoffman, 2007), biasing estimates of effects (Hoffman & Stawski, 2009) and over-estimating error terms (Lorch & Myers, 1990). In addition MLM can easily statistically control for any correlation between a given participant's scores across time (Hoffman & Rovine, 2007).

MLM was performed using the MIXED procedure of the SPSS statistical package, utilising the maximum likelihood method. A variety of models were developed to test the proposed hypotheses, with separate groups of models being created to examine the influence of activity demands on psychological detachment from work, and overcommitment to work. The 'goodness of fit' of a particular MLM is denoted by a -2log-likelihood (LL) statistic, with lower LL values suggesting a better fit between the proposed model and the data (Hoffman, 2007). Improvements in model fit (i.e., a decrease in LL) as the result of model

changes were tested for statistical significance, with the LL statistic drawn from a chi-squared distribution having degrees of freedom equivalent to the number of parameters changed between models (Hoffman, 2007; Hoffman & Stawski, 2009).

For the current study, level 1 (time-level) data reflects intra-personal variation and includes the activity demand, detachment and overcommitment subscale scores of participants across the various measurement occasions. Level-2 (person-level) data in the current study reflects time-invariant interpersonal differences, and includes participants' demographic information, as well as each participant's baseline detachment and overcommitment scores. So that model effects can be readily interpreted in terms of the 'average participant' and therefore more easily discussed, all scale and interval variables were centred relative to the variable's grand-mean (Hoffman & Stawski, 2009; Hofmann & Gavin, 1998). Centred variables include the dependent variables (i.e., psychological detachment, overcommitment) all level 1 independent variables (i.e., demand subscales), and the level-2 interval (control) variables (i.e., age, average hours spent working and studying. Categorical variables were not centred. The grand-mean centred scores can be interpreted as describing a participant's score on a variable relative to the average value observed across all participants at any given time.

The categorical level-2 variables of ethnicity and student-status were recomputed into dichotomous variables. For ethnicity, those participants who had indicated that they were of New Zealand European, and other European and USA heritage were coded as '0', while those who had indicated that they were of Chinese, Malaysian, South Korean, and other Asian heritage were coded as a '1'. For study status, those participants who'd indicated that they were not enrolled in tertiary education were coded as '0' while those who had indicated that they were enrolled in tertiary education either part or full-time were coded as '1'. The gender variable was unchanged, with males coded as '0' and females coded as '1'. A new categorical

variable (“Employed”) was created to represent the work-status of participants during the study. Those participants whose average hours spent working during the study was equal to zero were coded as ‘0’, while those whose average hours spent working was greater than zero were coded as ‘1’.

Analytical model.

For each dependent variable (detachment and overcommitment), the first model created was an empty or null-model which contained only the dependent variable and a participant identification variable. This model permitted the computation of an intra-class correlation coefficient (ICC) demonstrating the proportion of variance in the dependent variable attributable to between-person effects (Hoffman, 2007; Hoffman & Stawski, 2009). These ICCs thereby provide evidence to justify the use of multilevel models which consider the participant as a context – that is, participant-level data should be considered at level-2 of the model. The formula for calculating the ICC is presented in Equation 1.

$$ICC(1,1) = \frac{\text{Intercept variance}}{\text{Intercept variance} + \text{Residual variance}}$$

Equation 1. Formula for computing intra-class correlation coefficient.

Additional null models were constructed for detachment and overcommitment which included a variable denoting time. However the proportion of variance attributable to time was found to be ICC(1,1): $r=.014$ for psychological detachment, and ICC(1,1): $r=.000$ for overcommitment to work. As these ICCs are particularly low the variable of time was not included in any of the current study’s multilevel models.

Following the creation of null models, a group of multilevel models were developed for each of the two outcome variables (detachment and overcommitment). Models within groups were arranged into two ‘sets’. The first set examined only the main effect of work and leisure demands on psychological detachment from work and overcommitment, while the

second set examined both main and interactive effects of work and leisure demands. In addition to the demand variables, models from both sets 1 and 2 included demographic information as ‘control’ variables since these reflect stable interpersonal differences which may serve to influence a participant’s detachment, overcommitment, and demand scores (Hoffman & Stawski, 2009). Non-null models also control for the average number of hours each participant spent working and studying during each sampling period. This was achieved by summing each participant’s recorded work and study hours from each diary survey, and then calculating the mean of each participant’s summed hours. To allow mean detachment/overcommitment values to vary between participants, a random intercept was included in all models (i.e., the intercepts of each model were permitted to vary). Interpersonal differences are included within the models as random intercept terms, with each participant’s intercept reflecting their mean subscale scores across measurement occasions.

The fit of the models within model sets 1 and 2 are contrasted with that of the empty (null) model in order to demonstrate the improvement in fit obtained as the result of including the particular set of demands in the model. In addition, as models from set 2 are nested within set 1’s final model (model 1c), the fit of models within set 2 is also contrasted with that of model 1c. Model 1c contains the full set of control variables and fixed main effects and therefore any improvement in fit over model 1c can be attributed to the inclusion of interaction effects.

Models from set 2 include two-way interaction terms in order to test the hypothesised moderating effects of leisure demands on the relationship between work and study demands, and psychological detachment and overcommitment. These interactions were interpreted by constructing graphs in which the fitted dependent variable (DV) of interest was plotted upon the y-axis, the independent variable (IV) plotted upon the x-axis, and values of the moderating IV represented as separate sets of points (Sibley, 2008). Fitted values for the DV

were calculated using values of the IV and moderating IV which were equivalent to one standard deviation above or below the given variable's mean. With these values serving as 'high' and 'low' levels of the particular IV to facilitate interpretation of interaction effects where present.

Model definition.

The null model is defined by Equation 2, where i denotes the participant and j the particular point in time. Y_{ij} therefore represents participant i 's psychological detachment from work at time j . Note that the null model contains only an intercept term (β_{0i}), which has both a fixed (γ_{00}) and random component (u_i), and an error term (e_{ij}).

$$\text{Level 1: } Y_{ij} = \beta_{0i} + e_{ij}$$

$$\text{Level 2: } \beta_{0i} = \gamma_{00} + u_i$$

Equation 2. Empty or 'null' model

Given that it combines models 1a and 1b, model 1c perhaps best exemplifies the multilevel models of set 1 and contains both work and leisure demand terms. Model 1c is defined by Equation 3, and includes the centred independent variables at level 1, and time-invariant fixed control variables at level-2. In addition the model also contains both fixed and random intercept components at level 2.

$$\text{Level 1: } Y_{ij} = \beta_{0i} + \beta_1(WP_{ij} - WP..) + \beta_2(WM_{ij} - WM..) + \beta_3(WE_{ij} - WE..) + \beta_4(LP_{ij} - LP..) + \beta_5(LM_{ij} - LM..) + \beta_6(LE_{ij} - LE..) + e_{ij}$$

$$\text{Level 2: } \beta_{0i} = \gamma_{00} + \gamma_{01}(Age_i - Age..) + \gamma_{02}(Gender_i) + \gamma_{03}(Ethnicity_i) + \gamma_{04}(StudentStatus_i) + \gamma_{05}(EmploymentStatus_i) + \gamma_{06}(AvgHrsWorked_i - AvgHrsWorked..) + \gamma_{07}(BaseDetachment_i - BaseDetachment..) + u_i$$

Equation 3. Model 1c – main effect of work and leisure demands on psychological detachment from work

The level 1 independent variables of Model 1c represent work-related physical (WP), mental (WM), and emotional (WE) demands, and leisure-related physical (LP), mental (LM), and emotional (LE) demands. A variable name bearing two full-stops instead of subscript index terms (e.g., ‘WP..’) represents the named variable’s grand mean, and is included in the equation to denote grand-mean centring of a given variable. The psychological detachment and overcommitment models are very similar and differ only in the baseline variable and its associated coefficient (γ_{07}).

Given that it combines models 2a, 2b, and 2c, model 2d best exemplifies the multilevel models of set 2, containing the main and interaction effect terms of all set 2 models in addition to the control variables. The interaction terms are based on the centred main-effect terms, and model 2d is defined by Equation 4.

$$\begin{aligned} \text{Level 1: } Y_{ij} = & \beta_{0i} + \beta_1(WP_{ij} - WP..) + \beta_2(WM_{ij} - WM..) + \beta_3(WE_{ij} - WE..) + \beta_4(LP_{ij} - LP..) + \\ & \beta_5(LM_{ij} - LM..) + \beta_6(LE_{ij} - LE..) + \beta_7(LP \times WP_{ij}) + \beta_8(LM \times WM_{ij}) + \beta_9(LE \times WE_{ij}) \\ & + \beta_{10}(LP \times WM_{ij}) + \beta_{11}(LP_{ij} \times WE_{ij}) + \beta_{12}(LM_{ij} \times WP_{ij}) + \beta_{12}(LE_{ij} \times WP_{ij}) + e_{ij} \end{aligned}$$

$$\begin{aligned} \text{Level 2: } \beta_{0i} = & \gamma_{00} + \gamma_{01}(\text{Age}_i - \text{Age}..) + \gamma_{02}(\text{Gender}_i) + \gamma_{03}(\text{Ethnicity}_i) + \\ & \gamma_{04}(\text{StudentStatus}_i) + \gamma_{05}(\text{EmploymentStatus}_i) + \gamma_{06}(\text{AvgHrsWorked}_i - \\ & \text{AvgHrsWorked}..) + \gamma_{07}(\text{BaseDetachment}_i - \text{BaseDetachment}..) + u_i \end{aligned}$$

Equation 4. Model 2d – main and interaction effects of work and leisure demands on psychological detachment from work.

In addition to the main effects and control variable terms, model 2a includes only the LPxWP, LMxWM, and LExWE interactions, model 2b includes only the LPxWM and LPxWE interactions, and model 2c includes only the LMxWP and LExWP interactions. As with model set 1, the only difference between the detachment and overcommitment models is the level-2 baseline variable and its associated coefficient (γ_{07}).

Table 10
Summary of Model Variables

		Correlations (<i>r</i>)																
		Mean	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Age	27.81	11.89															
2	Gender	0.71	0.45	-.05														
3	Ethnicity	0.10	0.30	-.07	-.16**													
4	Student status	0.82	0.39	-.58**	.16**	.16**												
5	Employment status	0.69	0.46	-.04	-.01	-.24**	-.19**											
6	Average Hours Working/Studying	5.45	5.31	.10	.05	-.20**	-.49**	.68**										
7	Baseline Detachment	4.53	1.42	.15**	-.05	.11*	-.11*	.06	.16**									
8	Baseline Overcommitment	4.46	1.25	-.32**	.33**	.05	.35**	-.03	-.14**	-.61**								
9	Work Physical	2.24	1.01	-.16**	.32**	.32**	.10	.17**	.14**	-.06	.18**							
10	Work Mental	4.83	1.36	-.16**	.25**	.10	.20**	.10	.14**	-.09	.29**	.15**						
11	Work Emotional	3.24	1.40	-.29**	.29**	.03	.19**	.29**	.23**	-.40**	.43**	.23**	.48**					
12	Leisure Physical	3.15	1.19	-.03	.15**	-.09	.10	.04	.04	.15**	-.06	.14**	.37**	.12*				
13	Leisure Mental	2.81	1.01	-.22**	.10	.10	.18**	.08	.18**	-.17**	.33**	.22**	.35**	.44**	.46**			
14	Leisure Emotional	2.90	1.32	-.39**	.16**	-.12*	.32**	.05	.01	-.34**	.34**	-.02	.42**	.63**	.25**	.57**		
15	Detachment	4.40	1.10	.23**	-.17**	-.06	-.39**	.01	.09	.61**	-.60**	-.20**	-.33**	-.35**	.24**	-.10*	-.21**	
16	Overcommitment	4.13	1.16	-.30**	.30**	.13*	.46**	.02	-.16**	-.46**	.84**	.13*	.50**	.47**	-.06	.25**	.34**	-.72**

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. Variables 2 to 5 are categorical and are coded as follows: gender (0=male, 1=female), ethnicity (0=European, 1=Asian), student status (0=non-student, 1=tertiary student), employment status (0=unemployed, 1=employed). Variable 6 (average hours worked) represents each participant's mean number of hours spent working and studying. Variables 9 to 16 represent diary-level data which has been aggregated across all diary surveys. Possible values of variables 7 to 16 range from 1 to 7 with higher values representing greater levels of the demand type, psychological detachment or overcommitment to work.

Descriptives

The means and standard deviations of all variables included within the multilevel models are displayed in Table 10, as are the bivariate correlations between these variables. Values in the table for work and leisure demands (physical, mental and emotional), psychological detachment, and overcommitment to work are aggregated over all diary survey measurement occasions. Therefore the mean and standard deviation values presented in the table represent the mean and standard deviation (respectively) of the particular variable across all diary surveys.

Hypothesis Testing

Hypothesis 1 – association between detachment and overcommitment.

Examination of the bivariate correlations between psychological detachment and overcommitment to work reveals a strong negative relationship between the two sets of scores. This relationship is consistent across all measurement occasions, with coefficients ranging from $r = -.43$ to $r = -.80$, with all coefficients having $p < .01$ (see Table 11).

Table 11

Bivariate correlations between psychological detachment and overcommitment scores

	Baseline	1	2	3	Diary Survey				
					4	5	6	7	8
<i>r</i>	-.59	-.43	-.67	-.53	-.80	-.68	-.61	-.74	-.73

Note. Coefficients represent Pearson product-moment correlations and all have $p < .01$

Hypothesis 2 – psychological detachment from work.

To test the various components of hypothesis 2, the relationship between activity demands and psychological detachment from work was examined using a series of nested multilevel models, with psychological detachment as the dependent variable (see Table 12). For the sake of brevity, work and study demands will be referred to as ‘work demands’ during discussion of model results.

Null model.

Before constructing populated models to test hypothesis 2, the intra-class correlation coefficient for interpersonal differences was calculated by constructing an empty model. The null model was found to have a random intercept variance of 1.02 and an error variance of 1.47, resulting in a coefficient of $ICC(1,1)=.41$. This suggests that approximately 41% of the variance in psychological detachment ratings can be attributed to interpersonal differences, thereby providing justification for the multilevel analysis of psychological detachment and its possible antecedents.

Model set 1 – the main effects of work and leisure demands.

Three models were constructed in order to examine the main effects of work and leisure demands on psychological detachment which are implied by hypothesis 2. The first two of these models examined separately the effects of work demands, and leisure demands on psychological detachment from work. The third model essentially combined the prior two models, examining together the main effects of work and leisure demands on psychological detachment from work. All three models control for participant demographic details (e.g., age, gender, and ethnicity), baseline detachment scores, and the participant's average hours spent working and studying.

Table 12
Multilevel models of psychological detachment

		Null		Model 1a		Model 1b		Model 1c		Model 2a		Model 2b		Model 2c		Model 2d	
		Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE
Controls	Intercept	0.01	0.16	-0.60	0.43	-0.72	0.39	-0.60	0.42	-0.55	0.40	-0.60	0.42	-0.59	0.43	-0.53	0.41
	Age			-0.02	0.01	-0.01	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01
	Gender			-0.17	0.27	-0.29	0.24	-0.2	0.26	-0.20	0.25	-0.19	0.26	-0.21	0.26	-0.20	0.25
	Ethnic			-0.27	0.4	-0.44	0.37	-0.27	0.39	-0.26	0.38	-0.27	0.39	-0.28	0.40	-0.25	0.38
	Student			-0.9*	0.39	-1.00*	0.37	-0.89*	0.38	-0.91*	0.36	-0.89*	0.38	-0.86*	0.38	-0.89*	0.36
	Employed			-0.11	0.30	-0.23	0.27	-0.14	0.29	-0.17	0.27	-0.14	0.29	-0.14	0.29	-0.17	0.28
	Average hours working/studying			0.01	0.02	-0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
	Base detachment			0.46*	0.08	0.44*	0.08	0.45*	0.08	0.44*	0.08	0.45*	0.08	0.46*	0.08	0.45*	0.08
Main effects	Work physical			-0.03	0.06			-0.06	0.06	-0.03	0.06	-0.07	0.06	-0.05	0.06	-0.03	0.06
	Work mental			-0.09	0.05			-0.12*	0.05	-0.11*	0.05	-0.13*	0.05	-0.13*	0.05	-0.13*	0.05
	Work emotional			-0.07	0.06			-0.05	0.06	-0.03	0.06	-0.05	0.06	-0.05	0.06	-0.03	0.06
	Leisure physical					0.08	0.05	0.09	0.05	0.10*	0.05	0.09	0.05	0.09	0.05	0.12*	0.05
	Leisure mental					0.09	0.06	0.12	0.07	0.11	0.07	0.12	0.07	0.12	0.07	0.10	0.07
	Leisure emotional					-0.1	0.05	-0.07	0.06	-0.04	0.06	-0.07	0.06	-0.08	0.06	-0.04	0.06
Interaction effects	LPxWP									-0.02	0.03					-0.01	0.04
	LMxWM									0.08*	0.04					0.09*	0.04
	LExWE									-0.07*	0.03					-0.07*	0.03
	LPxWM											-0.01	0.03	-0.03	0.04	-0.02	0.03
	LPxWE											0.01	0.03	-0.03	0.04	0.03	0.03
	LMxWP													0.03	0.04	-0.03	0.05
	LExWP													0.03	0.04	-0.01	0.04
	Random intercept	1.02*	0.25	0.43*	0.13	0.38*	0.12	0.39*	0.13	0.33*	0.12	0.39*	0.13	0.4*	0.13	0.34*	0.12
Fit	Error variance	1.47*	0.12	1.38*	0.12	1.44*	0.11	1.36*	0.12	1.34*	0.11	1.35*	0.12	1.34*	0.11	1.32*	0.11
	df	2		16		16		19		22		21		21		26	
	-2*LL (χ^2)	1290.83		1104.73		1245.42		1096.1		1086.7		1095.88		1094.13		1084.76	

* $p < .05$. Note. 'Est' = Estimate, "LL" = log-likelihood. Interaction terms are abbreviated as follows: 'WP'= physical work demands; 'WM'=mental work demands; 'WE'=emotional work demands; 'LP'=physical leisure demands; 'LM'=mental leisure demands; 'LE'=emotional leisure demands.

Model 1a – work and study demands.

Model 1a examined the effects of work demands on psychological detachment. A large, negative fixed effect was found for student status (Est=-0.90, $p=.026$) suggesting that those enrolled in tertiary study tended to have lower detachment scores than their non-student peers. A moderate, positive fixed effect was found for baseline detachment levels (Est=0.46, $p<.001$). No fixed main effects were found for any of the work demand variables.

. The intercept of the model was found to vary between participants (Est=0.43, $p=.001$) suggesting that there are interpersonal differences in average or ‘default’ levels of psychological detachment. Model fit was $\chi^2(16)=1104.73$, demonstrating a significant improvement from the fit of the null model, with $\Delta\chi^2(14)=186.83$, $p<.001$.

Model 1b – leisure demands.

Model 1b examined the effects of leisure demands on psychological detachment. A large, negative effect of student status was found (Est=-1.00, $p=.009$) in addition to a moderate, positive fixed effect of baseline detachment levels (Est=0.44, $p<.001$). No fixed main effects were found for any of the leisure demand variables.

The model’s intercept was again found to vary significantly between participants (Est=0.38, $p=.001$). The overall fit of model 1b was $\chi^2(16)=1245.42$ which represents a significant improvement from the null model’s fit, with $\Delta\chi^2(14)=45.41$, $p<.001$.

Model 1c – work and leisure demands.

Model 1c combines models 1a and 1b by considering the demands of both work activities and leisure activities within a single model. A strong, negative fixed effect of student status was found (Est=-0.89, $p=.023$), in addition to a moderate, positive fixed effect of baseline detachment levels (Est=0.45, $p<.001$). A fixed main effect was also found for work mental demands, with a small, negative association observed between work-related

mental demands and psychological detachment ($\text{Est}=-0.12, p=.016$). No main effects were found for work physical and emotional demands, or for leisure physical, mental, and emotional demands.

As in models 1a and 1b, the current model's intercept was found to vary between participants ($\text{Est}=0.39, p=.002$). The fit of model 1c was $\chi^2(19)=1096.10$, which represents an improvement in fit over the null model of $\Delta\chi^2(17)=194.73, p<.001$.

Model set 2 – the main and interaction effects of work and leisure activities.

Four models were constructed to examine the moderating effects of leisure demands on the relationship between work demands and psychological detachment postulated by hypothesis 2. All four models included the main effects of work and leisure demands and controlled for participant demographic details (e.g., age, gender, and ethnicity), baseline detachment scores, and the participant's average hours spent working and studying. Models 2a, 2b, and 2c also included two-way interaction terms which were comprised of particular pairings of work and leisure demands. Model 2d combined these three models by including all of the proposed interaction terms.

Model 2a –work and leisure demands of a similar type.

Model 2a was constructed in order to test hypothesis 2a, which concerns the effect of similar leisure demands on detachment. Therefore model 2a included interaction terms comprised of work and leisure physical demands, work and leisure mental demands, and work and leisure emotional demands. These interactions thereby serve to represent the degree of similarity in the intensity of work and leisure demands.

A large, negative fixed effect of student status was found ($\text{Est}=-0.91, p=.015$), in addition to a moderate, positive fixed effect of baseline detachment levels ($\text{Est}=0.44, p<.001$). A small, negative fixed effect was found for work mental demands ($\text{Est}=-0.11, p=.025$), and a

small, positive fixed effect was found for leisure physical demands ($\text{Est}=0.10, p=.041$). No main effects were found for physical and emotional work demands, or for mental and emotional leisure demands.

No interaction effect was observed between work and leisure physical demands, however leisure mental demands were found to moderate the relationship between work mental demands and psychological detachment ($\text{Est}=0.08, p=.032$). This interaction can be interpreted as meaning that a participant whose leisure activities are mentally undemanding will likely demonstrate lower psychological detachment when their work is more mentally demanding than the average person's. Conversely, those participants whose leisure activities entail less mental demands than the average person's leisure activities are likely to display similar levels of psychological detachment regardless of the level of mental demands they experience as a part of their work activities (see Figure 2).

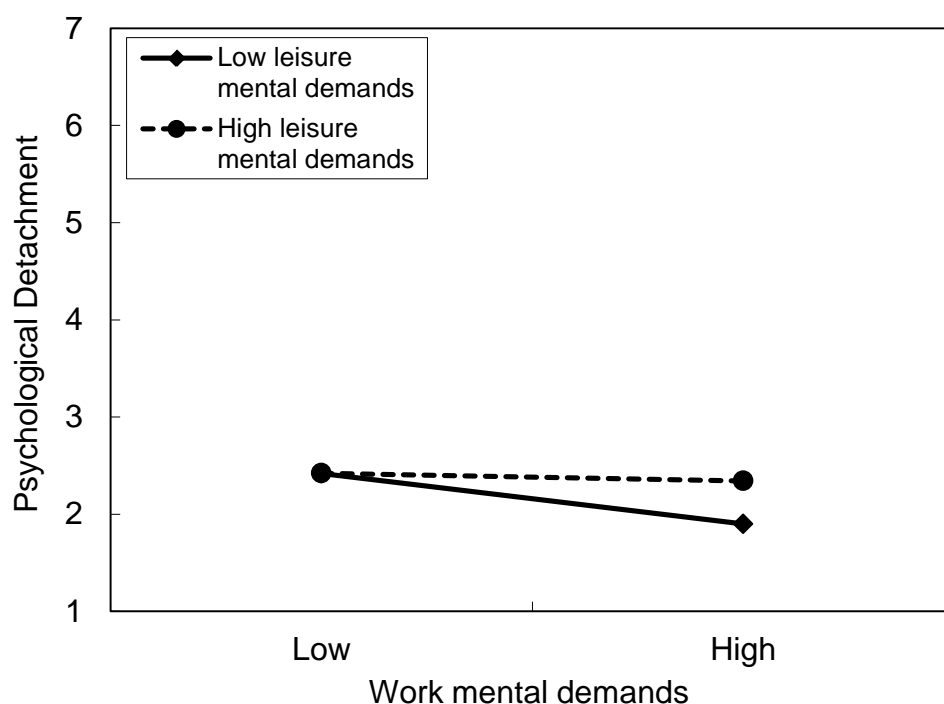


Figure 2. Mean psychological detachment scores for instances of high (+1 SD) and low (-1 SD) work and leisure mental demands as predicted by models 2a & 2d.

Leisure emotional demands were found to moderate the relationship between work emotional demands and psychological detachment ($Est=-0.07$, $p=.006$). This represents a ‘cross-over’ interaction as neither work nor leisure emotional demands have any fixed main effect on psychological detachment. This interaction can be interpreted to mean that for those participants whose leisure activities are more emotionally demanding than the average persons’, work activities which are more mentally demanding than the average person’s will be associated with higher psychological detachment levels, while lower than average mental work demands will be associated with lower psychological detachment levels. In addition, those participants whose leisure activities entail less emotional demands than the average person’s will experience lower psychological detachment when the emotional demands of their work are higher than the average person’s, and higher psychological detachment when the emotional demands of their work activities are higher than the average person’s (see Figure 3).

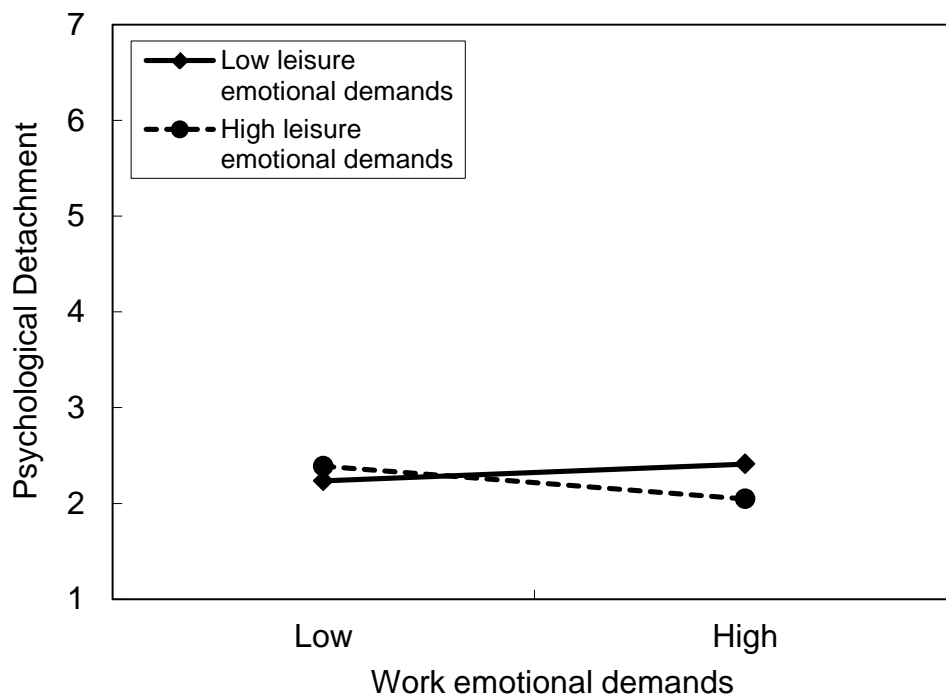


Figure 3. Mean psychological detachment scores for instances of high (+1 SD) and low (-1 SD) work and leisure emotional demands as predicted by model 2a & 2d.

As in all previous models, the intercept was found to vary between participants (Est=0.33, $p=.004$). The fit of model 2a was found to be $\chi^2(22)=1086.70$, which represents a significant improvement in fit over that of model 1c ($\Delta\chi^2(3)=9.4$, $p=.024$) and the null model ($\Delta\chi^2(20)=204.13$, $p<.001$).

Model 2b – physical leisure demands, and mental and emotional work demands.

Model 2b was constructed in order to test hypothesis 2b, which states that high physical leisure demands suppress the relationship between mental and emotional work demands, and psychological detachment. Therefore the model included interaction terms which were comprised of the interaction between physical leisure and mental work demands, and physical leisure and emotional work demands.

The model found a large, negative fixed effect of student status (Est=-0.86, $p=.023$) and a moderate, positive fixed effect of baseline detachment levels (Est=0.45, $p<.001$). A small, negative fixed main effect was found for work mental demands (Est=-0.13, $p=.017$), however no main effects were found for physical or emotional work demands, or for physical, mental or emotional leisure demands. No interaction effects were found for mental work and physical leisure demands, nor for emotional work and physical leisure demands.

The intercept was found to vary between participants (Est=0.39, $p=.002$), and model fit was $\chi^2(21)=1095.88$, which represents an improvement in fit over that of the null model ($\Delta\chi^2(19)=194.95$, $p<.001$), but not over model 1c ($\Delta\chi^2(2)=0.22$, $p=.896$).

Model 2c – mental and emotional leisure demands, and physical work demands.

Model 2c was constructed in order to test hypothesis 2c, which proposes that the mental and emotional demands of leisure activities will suppress the relationship between physical work demands and detachment. Therefore model 2c included two interaction terms,

which are comprised of the interaction between physical work and mental leisure demands, and physical work and emotional leisure demands.

A large, negative fixed effect of student status was found ($\text{Est}=-0.86, p<.028$), along with a moderate, positive fixed effect of baseline detachment levels ($\text{Est}=0.46, p<.001$). Mental work demands were found to influence psychological detachment, having a small, negative fixed main effect ($\text{Est}=-0.13, p=.012$). No main effects were found for physical or emotional work demands, or for physical, mental or emotional leisure demands. No interaction effects were observed between mental leisure and physical work demands, or emotional leisure and physical work demands.

The intercept was observed to vary between participants ($\text{Est}=0.40, p=.002$) and the fit of the model was $\chi^2(21)=1094.13$. This represents an improvement over the fit of the null model ($\Delta\chi^2(19)=196.70, p<.001$), but not over that of model 1c ($\Delta\chi^2(2)=1.97, p=.373$).

Model 2d – combination of all interaction models.

Model 2d examined both the main effects of work and leisure demands, and all previously considered two-way interactive effects. This model therefore represents the combination of models 2a, 2b, and 2c.

The model found a large, negative fixed effect of student status ($\text{Est}=-0.89, p=.018$), and a moderate, positive fixed effect of baseline detachment levels ($\text{Est}=0.45, p<.001$). A small, negative fixed main effect of mental work demands was found ($\text{Est}=-0.13, p=.016$), as was a small, positive fixed main effect of physical leisure demands ($\text{Est}=0.12, p=.015$).

Mental leisure demands were found to moderate the relationship between mental work demands and psychological (Est=0.09, $p=.029$). As in model 2a, this interaction can be interpreted as meaning that a participant whose leisure activities are mentally demanding will likely demonstrate lower psychological detachment when their work is more mentally demanding than the average person's. Conversely, those participants whose leisure activities

entail less mental demands than the average person's leisure activities are likely to display similar levels of psychological detachment regardless of the level of mental demands they experience as a part of their work activities (see Figure 2).

Emotional leisure demands were found to moderate the relationship between emotional work demands and psychological detachment ($\text{Est}=-0.07, p=.010$). As in model 2a this represents a cross over interaction which can be interpreted to mean that for those participants whose leisure activities are more emotionally demanding than the average persons', work activities which are more mentally demanding than the average person's will be associated with higher psychological detachment levels, while lower than average mental work demands will be associated with lower psychological detachment levels. In addition, those participants whose leisure activities entail less emotional demands than the average person's will experience lower psychological detachment when the emotional demands of their work are lower than the average person's, and higher psychological detachment when the emotional demands of their work activities are higher than the average person's (see Figure 3).

The intercept was found to vary between participants ($\text{Est}=0.34, p=.004$), and the fit of the model was found to be $\chi^2(26)=1084.76$. This represents an improvement in fit over that of the null model ($\Delta\chi^2(24)=206.07, p<.001$) but not that of model 1c ($\Delta\chi^2(7)=11.34, p=.124$).

Hypothesis 3 - overcommitment to work.

To test the various components of hypothesis 3, the relationship between activity demands and overcommitment to work was examined using a series of nested multi-level models, with overcommitment as the dependent variable (see Table 13). For the sake of brevity, work and study demands will be referred to as 'work demands' during discussion of model results.

Null model.

Before constructing populated models to test hypothesis 3, the intra-class correlation coefficient for interpersonal differences was calculated by constructing an empty model. The null model was found to have a random intercept variance of 1.25 and an error variance of 0.75, resulting in a coefficient of $ICC(1,1)=.62$. This suggests that approximately 62% of the variance in overcommitment ratings can be attributed to interpersonal differences, thereby providing justification for the multilevel analysis of overcommitment to work and its possible antecedents.

Model set 1 – the main effects of work and leisure demands.

Three models were constructed in order to examine the main effects of work and leisure demands on overcommitment which are implied by hypothesis 3. The first two of these models examined separately the effects of work demands and leisure demands on overcommitment to work. The third model essentially combined the prior two models, examining together the fixed main effects of work and leisure demands on overcommitment to work. All three models control for participant demographic details (e.g., age, gender), baseline overcommitment scores, and the participant's average hours spent working and studying.

Table 13
Multilevel models of overcommitment to work

		Null		Model 1a		Model 1b		Model 1c		Model 2a		Model 2b		Model 2c		Model 2d	
		Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE
Controls	Intercept	0.01	0.16	0.43	0.27	0.55	0.29	0.45	0.26	0.46	0.26	0.45	0.26	0.41	0.27	0.42	0.26
	Age			0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
	Gender			0.03	0.18	0.11	0.19	0.04	0.17	0.05	0.17	0.04	0.17	0.04	0.17	0.05	0.17
	Ethnic			0.17	0.25	0.34	0.28	0.20	0.24	0.21	0.24	0.19	0.24	0.16	0.25	0.18	0.25
	Student			0.67*	0.25	0.74*	0.28	0.66*	0.24	0.65*	0.24	0.66*	0.24	0.64*	0.25	0.62*	0.24
	Employed			0.13	0.19	0.28	0.21	0.15	0.18	0.17	0.18	0.15	0.18	0.14	0.18	0.16	0.18
	Average hours working/studying			-0.02	0.01	0.01	0.02	-0.02	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01
	Base detachment			0.66*	0.07	0.70*	0.08	0.66*	0.07	0.67*	0.06	0.66*	0.07	0.67*	0.07	0.68*	0.07
Main effects	Work physical			-0.03	0.04			-0.02	0.04	-0.03	0.04	-0.02	0.04	-0.03	0.04	-0.03	0.04
	Work mental			0.17*	0.03			0.18*	0.03	0.18*	0.03	0.18*	0.03	0.19*	0.03	0.18*	0.03
	Work emotional			0.12*	0.04			0.11*	0.04	0.11*	0.04	0.11*	0.04	0.11*	0.04	0.11*	0.04
	Leisure physical					-0.02	0.04	-0.04	0.03	-0.04	0.03	-0.03	0.03	-0.04	0.03	-0.05	0.03
	Leisure mental					-0.01	0.05	-0.07	0.04	-0.06	0.04	-0.07	0.04	-0.07	0.04	-0.05	0.05
Interaction effects	Leisure emotional					0.07	0.04	0.05	0.04	0.03	0.04	0.05	0.04	0.05	0.04	0.03	0.04
	LPxWP									0.00	0.02					-0.02	0.02
	LMxWM									-0.03	0.02					-0.04	0.03
	LExWE									0.03	0.02					0.02	0.02
	LPxWM											0.00	0.02	0.03	0.03	0.00	0.02
	LPxWE											0.00	0.02	0.00	0.02	0.00	0.02
	LMxWP													-0.03	0.03	0.05	0.03
	LExWP													0	0.02	-0.01	0.03
Fit	Random intercept	1.25*	0.27	0.17*	0.05	0.23*	0.07	0.15*	0.05	0.14*	0.05	0.15*	0.05	0.16*	0.05	0.15*	0.05
	Error variance	0.75*	0.06	0.57*	0.05	0.75*	0.06	0.57*	0.05	0.57*	0.05	0.57*	0.05	0.56*	0.05	0.56*	0.05
	df	2		16		16		19		22		21		21		26	
		1080.91		811.58		1007.28		806.45		803.03		806.41		804.47		800.03	
		-2*LL (χ^2)															

* $p < .05$. Note. 'Est' = Estimate, "LL" = log-likelihood. Interaction terms are abbreviated as follows: 'WP'= physical work demands; 'WM'=mental work demands; 'WE'=emotional work demands; 'LP'=physical leisure demands; 'LM'=mental leisure demands; 'LE'=emotional leisure demands.

Model 1a – work and study demands.

Model 1a examined the effects of work demands on overcommitment. A large, positive fixed effect was found for student status (Est=0.67, $p=.011$), suggesting that those enrolled in tertiary study tended to have higher overcommitment scores than their non-student peers. In addition, a large, positive fixed effect was found for baseline overcommitment levels (Est=0.66, $p<.001$). Small, positive fixed main effects were found for both mental work (Est=0.17, $p<.001$) and emotional work demands (Est=0.12, $p=.001$), however no main effect was found for physical work demands.

The intercept of the model was found to vary between participants (Est=0.43, $p=.002$) suggesting that there are interpersonal differences in average or ‘default’ levels of psychological detachment. Model fit was $\chi^2(16)=811.58$, demonstrating a significant improvement from the fit of the null model, with $\Delta\chi^2(14)=269.33$, $p<.001$.

Model 1b – leisure demands.

Model 1b examined the effects of leisure demands on overcommitment. Large, positive fixed effects were found for both student status (Est=0.74, $p=.013$) and baseline overcommitment levels (Est=0.70, $p<.001$). No fixed main effects were found for any of the leisure demand variables. The model’s intercept was again found to vary significantly between participants (Est=0.23, $p=.001$). The fit of model 1b was $\chi^2(16)=1007.28$ which represents a significant improvement from the fit of null model of $\Delta\chi^2(14)=73.63$, $p<.001$.

Model 1c – work and leisure demands.

Model 1c combined models 1a and 1b by considering the demands of both work activities and leisure activities within a single model. A strong, positive fixed effect was found for both student status (Est=0.66, $p=.010$) and baseline overcommitment levels (Est=0.66, $p<.001$). Small, positive fixed main effects were found for mental work demands

(Est=0.18, $p<.001$), and for emotional work demands (Est=0.11, $p=.002$). No main effects were found for physical work demands, or for physical, mental, or emotional leisure demands.

As in models 1a and 1b, the current model's intercept was found to vary between participants (Est=0.15, $p=.003$). The fit of model 1c was $\chi^2(19)=806.45$, which represents an improvement in fit over the null model of $\Delta\chi^2(17)=274.46$, $p<.001$.

Model set 2 – the main and interaction effects of work and leisure activities.

Four models were constructed to examine the moderating effect of leisure activity demands on the relationship between work demands and overcommitment postulated by hypothesis 3. All four models included fixed main effects of work and leisure demands, and models 2a, 2b, and 2c include two-way interaction terms comprised of particular pairings of work and leisure demands. Model 2d combines these three models by including all of the proposed interaction terms. As with model set 1, all models within model set 2 control for participant demographic details (e.g., age, gender, ethnicity), baseline overcommitment scores, and the participant's average hours spent working and studying.

Model 2a –work and leisure demands of a similar type.

Model 2a was constructed in order to test hypothesis 3a, which concerns the effect of similar leisure demands on overcommitment. Therefore model 2a included interaction terms comprised of work and leisure physical demands, work and leisure mental demands, and work and leisure emotional demands. These interactions thereby serve to represent the degree of similarity in intensity of work and leisure demands.

Large, positive fixed effects were found for both student status (Est=0.65, $p=.009$) and baseline overcommitment levels (Est=0.67, $p<.001$). A small, positive fixed main effect was found for mental work demands (Est=0.18, $p<.001$), and for emotional work demands

(Est=0.11, $p=.004$). No main effects were found for physical work demands, or for physical, mental, or emotional leisure demands. Nor were interaction effects observed between work and leisure physical demands, work and leisure mental demands, or work and leisure emotional demands.

As in all previous models, the model's intercept was found to vary between participants (Est=0.14, $p=.005$). The fit of model 2a was found to be $\chi^2(22)=803.03$, which represents a significant improvement in fit over that of the null model ($\Delta\chi^2(20)=277.87$, $p<.001$), but not over that of model 1c ($\Delta\chi^2(3)=3.42$, $p=.331$).

Model 2b – physical leisure demands, and mental and emotional work demands.

Model 2b was constructed in order to test hypothesis 3b, which states that high physical leisure demands suppress the relationship between mental and emotional work demands, and overcommitment. Therefore the model included interaction terms which were comprised of the interaction between physical leisure and mental work demands, and physical leisure and emotional work demands.

A large, positive fixed effect was found for both student status (Est=0.66, $p=.010$) and baseline overcommitment levels (Est=0.66, $p<.001$). A small, positive fixed main effect was found for mental work demands (Est=0.18, $p<.001$), and for emotional work demands (Est=0.11, $p=.003$). No main effects were found for physical work demands, or for physical, mental, or emotional leisure demands. Nor were any interaction effects found for physical leisure and mental work demands, or for physical leisure and emotional work demands.

The model intercept was found to vary across participants (Est=0.15, $p=.003$), and model fit was $\chi^2(21)=806.41$, which represents an improvement in fit over that of the null model ($\Delta\chi^2(19)=274.50$, $p<.001$), but not over model 1c ($\Delta\chi^2(2)=0.04$, $p=.980$).

Model 2c – mental and emotional leisure demands, and physical work demands.

Model 2c was constructed in order to test hypothesis 3c, which proposes that the mental and emotional demands of leisure activities will suppress the relationship between physical work demands and overcommitment. Therefore model 2c included two interaction terms, which are comprised of the interaction between physical work and mental leisure demands, and physical work and emotional leisure demands.

A large, positive fixed effect was found for both student status (Est=0.64, $p=.013$) and baseline overcommitment levels (Est=0.67, $p<.001$). A small, positive fixed main effect was also found for mental work demands (Est=0.19, $p<.001$), and for emotional work demands (Est=0.11, $p=.003$). No main effects were found for physical work demands, or for physical, mental, or emotional leisure demands. Neither were any interaction effects observed between mental leisure and physical work demands, or emotional leisure and physical work demands.

The intercept was found to vary between participants (Est=0.16, $p=.003$) and the fit of the model was $\chi^2(21)=804.47$. This represents an improvement over the fit of the null model ($\Delta\chi^2(19)=276.44$, $p<.001$), but not over that of model 1c ($\Delta\chi^2(2)=1.99$, $p=.370$).

Model 2d – combination of all interaction models.

Model 2d examines both the main effects of work and leisure demands, and all previously considered two-way interactive effects. This model therefore represents the combination of models 2a, 2b, and 2c.

The model found large, positive fixed effects for student status (Est=0.62, $p=.014$) and baseline overcommitment levels (Est=0.68, $p<.001$). Small, positive fixed main effects were also found for mental work demands (Est=0.18, $p<.001$), and for emotional work demands (Est=0.11, $p=.005$). No main effects were found for physical work demands, or for physical, mental, or emotional leisure demands. No interaction effects were observed for any of the seven moderation relationships included in the model.

The model's intercept was found to vary across participants ($\text{Est}=0.15$, $p=.005$), and the fit of the model was found to be $\chi^2(26)=800.03$. This represents an improvement in fit over that of the null model ($\Delta\chi^2(24)=280.87$, $p<.001$), but not that of model 1c ($\Delta\chi^2(7)=6.42$, $p=.492$).

Discussion

Summary of Results

Enrolment as a university student was found to have a strong effect on both psychological detachment and overcommitment. Students tended to have much lower psychological detachment levels and much higher levels of overcommitment than their non-student peers, suggesting higher rates of work ruminations within this group. However none of the other demographic variables included in the models (e.g., age, gender, ethnicity) were observed to influence psychological detachment or overcommitment.

Hypothesis 1 – association between overcommitment and detachment.

Hypothesis 1 predicted that overcommitment would be associated with low psychological detachment from work. Results showed a strong, negative correlation between overcommitment and detachment for all measurement occasions in the study, with the data from the current study thereby providing strong evidence in support of hypothesis 1. This means that participants experiencing lower than average psychological detachment tended to experience higher than average levels of overcommitment. Likewise, participants experiencing higher than average psychological detachment tended to experience lower than average levels of overcommitment. This finding is consistent with parallels in the existing research which shows the two constructs to have similar causes, symptoms and outcomes (Etzion, et al., 1998; Feuerhahn, et al., 2012; Fritz, et al., 2010; Geurts & Sonnentag, 2006; Preckel, et al., 2005)

Hypothesis 2 – antecedents to psychological detachment.

Hypothesis 2 predicted that leisure activity demands would moderate the relationship between work demands and psychological detachment. This hypothesis implies that work and leisure activities directly influence psychological detachment levels, a supposition for which limited support was obtained. In particular, the current study showed that mentally demanding work activities lead to a significant decrease in detachment, while physically demanding leisure activities appear to facilitate psychological detachment from work. The finding that physically demanding leisure time assists in recovery-processes is consistent with the findings of previous research (Leitner & Leitner, 2012; Zuzanek, Robinson, et al., 1998).

The observation that high physical and emotional work demands do not influence detachment is surprising given the existing body of research concerning fatigue and recovery processes. However this result might be explained by the current study's sample being composed primarily of university students, whose study-related activities are likely to afford them a higher degree of decision latitude than they would otherwise experience in an ordinary work environment. This increased decision latitude might then serve to moderate the relationship between work and study demands, and psychological detachment (Karasek, 1979; Sonnentag & Zijlstra, 2006; Totterdell, et al., 2006). However, given the finding that students have lower levels of detachment, this seems unlikely, and it may indeed be the case that physical and emotional work demands simply did not influence psychological detachment for participants of the current study.

Hypothesis 2a predicted that leisure demands which are similar to work demands will be associated with decreased detachment. Extremely limited support was found for this hypothesis, with two moderating relationships found, only one of which provides supporting evidence. The first moderating relationship directly conflicts with the hypothesis and shows the detachment-inhibiting effect of mentally demanding work activities to occur only when

leisure activities are not mentally demanding. Therefore, psychological detachment is decreased by dissimilar leisure and work emotional demands, which is the direct opposite of the predicted effect. This result might be explained by the ‘distraction’ process by which detachment is believed to occur (Fritz, et al., 2010; Trenberth & Dewe, 2002). Put simply, leisure activities which are not mentally demanding do not serve to distract the individual from their work-related thoughts, while mentally demanding leisure activities do distract the individual, but only to the extent that they buffer the effect of work demands on detachment.

The second moderating relationship represents a ‘cross-over’ interaction, in which conditions of high-work, low-leisure emotional demands, and low-work, high-leisure emotional demands lead to higher levels of psychological detachment than do conditions of high-work, high-leisure emotional demands, and low-work, low-leisure emotional demands. Therefore this relationship shows that similar work and leisure emotional demands lead to lower levels of psychological detachment, thereby providing evidence in support of hypothesis 2a. This result is consistent with existing research that shows recovery processes to be most effective when depleted resources (such as those experienced after a day of faking or suppressing emotions) are no longer-taxed during leisure time (Grandjean, 1985; Sonnentag, 2001). The results of this study suggest that resources depleted during leisure time must similarly be ‘rested’ during work time in order for optimal recovery.

Hypothesis 2b predicted that high physical leisure demands would suppress the relationship between mental work demands and psychological detachment, and between emotional work demands and psychological detachment. No moderation relationships were found in support of this hypothesis.

Hypothesis 2c predicted that low mental or emotional leisure demands would suppress the relationship between physical work demands and psychological detachment. No moderation relationships were found which supported this hypothesis.

Hypothesis 3 – antecedents to overcommitment.

Hypothesis 3 predicted that leisure activity demands would moderate the relationship between work demands and overcommitment to work. This hypothesis implies that work and leisure activities directly influence overcommitment, a supposition for which limited support was obtained. The current study showed that work activities which were either mentally or emotionally demanding would lead to increased levels of overcommitment, however no relationship was found between leisure demands and overcommitment. This finding is consistent with existing research which shows overcommitment to have resulted from high task-demands coupled with an overestimation of coping ability. Resulting in the individual allocating excessive physical, cognitive, and emotional resources towards meeting these demands (Feuerhahn, et al., 2012; Joksimovic, et al., 2002; Kudielka, et al., 2004; Preckel, et al., 2005).

No support was found, in the current data set, for hypothesis 3a, which predicted that leisure demands which are similar to work demands will lead to increased levels of overcommitment. Hypothesis 3b predicted that leisure activities which were physically demanding would suppress the relationships between mental work demands and overcommitment, and between emotional work demands and overcommitment. No moderation relationships were found to support this hypothesis. Finally, hypothesis 3c predicted that leisure activities which were mentally or emotionally undemanding would suppress the relationship between physical work demands and overcommitment, however no moderation relationships were observed in support of this hypothesis.

Methodological Considerations and Suggestions for Future Research

The research discussed in the current study's literature review described a wide range of influences on the incidence of work ruminations as measured by psychological detachment and overcommitment from work. However, given the repeated-measures nature of the

research design, it was decided to limit the number of items in the baseline and diary surveys with aims to minimise attrition rates. This means that it is possible that the models used in hypothesis testing did not control for an adequate range of possible influences on the prevalence of work ruminations. Researchers attempting to replicate or expand upon this study would do well to examine factors pertaining to job control and autonomy (Karasek, 1979; Sonnentag & Zijlstra, 2006), optimism (Totterdell, et al., 2006), coping self-efficacy (Sanders, 1983), the extent to which the participant enjoys the work activities they're performing (van Hooff, et al., 2011) and the social and physical qualities of the participant's working environment (Klitzman, et al., 1990; Mellor, et al., 2012; Sparks & Cooper, 1999).

Furthermore, while the detachment and overcommitment subscales have been validated in numerous research studies, the activity demand items developed for this study have not. The current study's activity demand items typically load onto three factors which can be readily identified as physical, mental, and emotional demands, and which demonstrate good internal consistency reliability. However, as the study did not examine the convergent validity of these items with any pre-existing measures, there is little evidence to suggest that the items are content valid and reasonably free from bias and error. If these items were in fact biased or error prone, this would decrease and potentially confound effect estimates. Therefore if this study were to be replicated or expanded upon, the researcher would be well advised to validate the activity demand items against a reliable and valid measure of activity demands such as the "Job demand" subscale of Karasek's (1979) "Job Demands and Decision Latitude" measure, and the "Emotional Labour Scale" (Brotheridge & Lee, 2003).

The size of the participant pool was relatively small when compared against the sample sizes of the longitudinal studies examined in the literature review. Admittedly, repeated-measures studies tend to achieve higher statistical power than cross-sectional studies as the result of controlling for individual differences (Hoffman & Rovine, 2007; Hoffman &

Stawski, 2009). However the number of participants in the current study is likely to have been too small given the number of predictor and control variables, and the observed effect sizes (Cohen, 1992; Hoffman & Rovine, 2007). Nevertheless, while the observed effects were quite small, this was not unexpected given that when compared with an experimental design, correlational research designs tend to yield much lower effect estimates (Zapf, Dormann, & Frese, 1996).

Finally, the participant pool was comprised primarily by people of European origin or descent, university students, and had quite a young mean and median age. This composition calls into question the general validity of the study's findings, particularly in regards to older individuals, non-students, and people of non-European origin. Therefore future studies should require a more numerous and diverse participant pool if they are to more accurately portray the general population.

Final Conclusions

Whilst university students were found to spend much more of their free time thinking about work and have much greater difficulty avoiding these thoughts, age, gender, and ethnicity do not influence the prevalence of work ruminations, nor the difficulty experienced in 'escaping' these thoughts.

Taken together, the results of this study demonstrate that particular characteristics of a person's work and leisure times can influence their tendency to think about work during leisure time. Physically demanding leisure activities such as a strenuous work-out or difficult hike, will lead to the individual spending less of their free time thinking about work. If an individual's work activities are mentally demanding or difficult, such as those involving tricky calculations or learning new information, and their leisure activities are not mentally demanding, then that individual is likely to spend more of their free time thinking about work than an individual whose work is not mentally demanding. Likewise, when work activities

are emotionally draining, such as those which require faking enthusiasm or suppressing anger, and leisure activities are also emotionally demanding, the individual is likely to spend a greater proportion of their free time thinking about work. The inverse of this relationship is also true – work activities which are not emotionally demanding, when coupled with leisure activities which are not emotionally demanding, will result in an increased proportion of free time spent thinking about work.

The observed relationship between work demands, leisure demands, and work-related thoughts reinforces the notion that psychological detachment is ultimately a measure of ‘distraction’ from work (Etzion, et al., 1998; Fritz, et al., 2010; Sonnentag, 2001). While certain work demands cause the individual to think more about work during their free time, demanding leisure activities serve to distract the participant from their work and induce a condition of psychological detachment. When the individual is sufficiently detached from their work recovery processes can occur unabated, resulting in decreased fatigue and better outcomes for the individual in terms of physical and mental health, emotional well-being and job performance (Fritz & Sonnentag, 2005; Tucker, et al., 2008; Zuzanek, 1998).

The implication of these findings for the individual is that leisure activity demands are capable of mitigating, or at the very least buffering, the detrimental effects of work and study demands. This means that, regardless of the type of work/study demands (e.g., physical, mental, or emotional), physically demanding leisure activities can be used to decrease work ruminations. If an individual’s work exposes them to strain-inducing mental demands, then mentally demanding leisure activities can be used to diminish (though not reverse) the incidence of work ruminations, thereby facilitating recovery from fatigue. However while physically and mentally demanding leisure activities show generally positive outcomes, emotional leisure demands must be carefully balanced in relation to emotional demands emanating from the work place. In particular, should an individual’s work entail significant

emotional labour, then they are advised to engage in leisure activities which are not emotionally demanding. Likewise, if their work is emotionally undemanding, engaging in leisure activities which do entail notable emotional demands will likely result in decreased work ruminations and greater recovery from fatigue.

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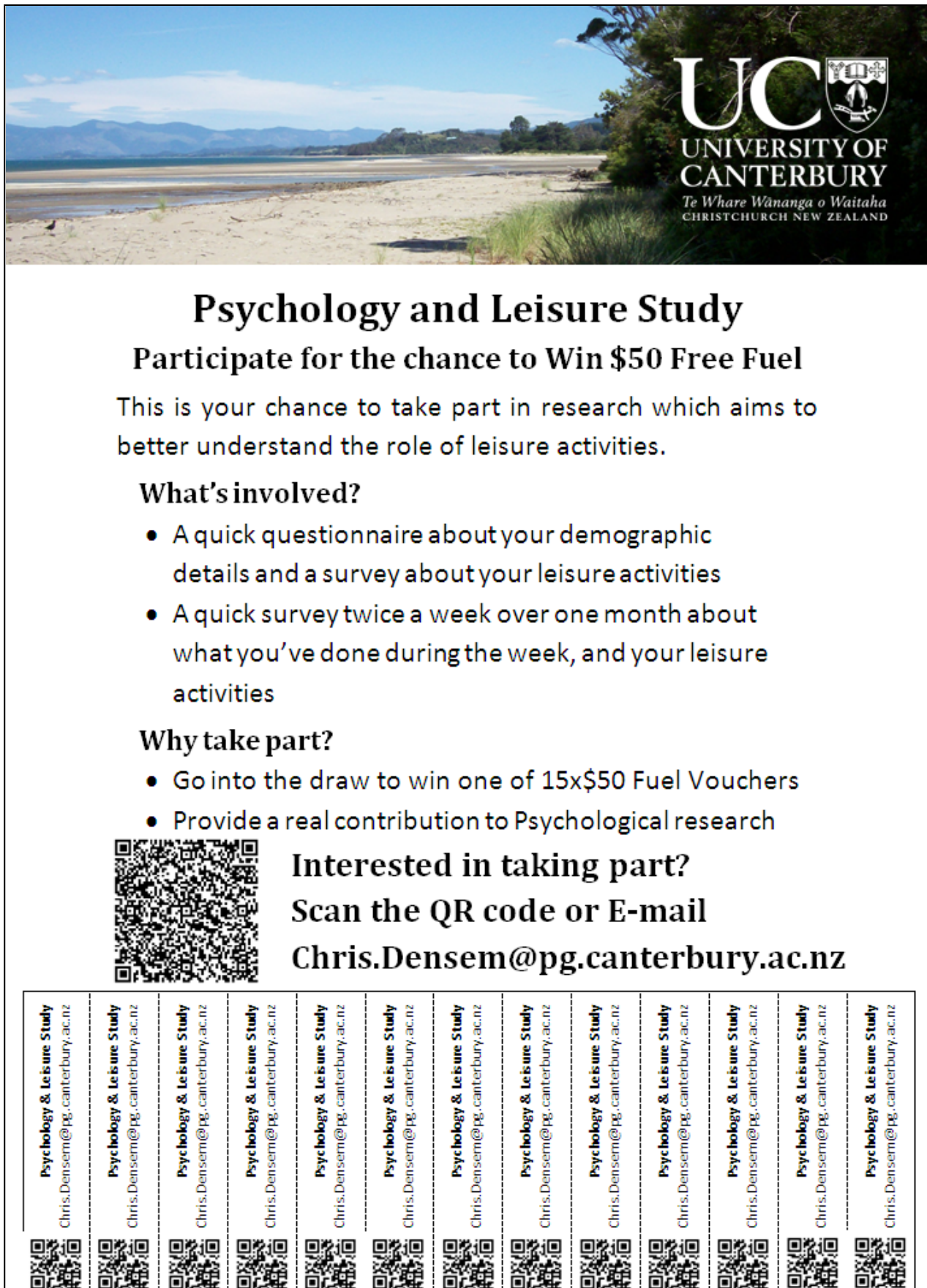
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Appendices

Appendix A – Recruitment Poster



UC
UNIVERSITY OF
CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Psychology and Leisure Study

Participate for the chance to Win \$50 Free Fuel


This is your chance to take part in research which aims to better understand the role of leisure activities.

What's involved?

- A quick questionnaire about your demographic details and a survey about your leisure activities
- A quick survey twice a week over one month about what you've done during the week, and your leisure activities

Why take part?

- Go into the draw to win one of 15x\$50 Fuel Vouchers
- Provide a real contribution to Psychological research



Interested in taking part?

Scan the QR code or E-mail

Chris.Densem@pg.canterbury.ac.nz

Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz	Psychology & Leisure Study Chris.Densem@pg.canterbury.ac.nz
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Figure A1. Poster used in recruiting participants

Appendix B – Electronic Recruitment Messages

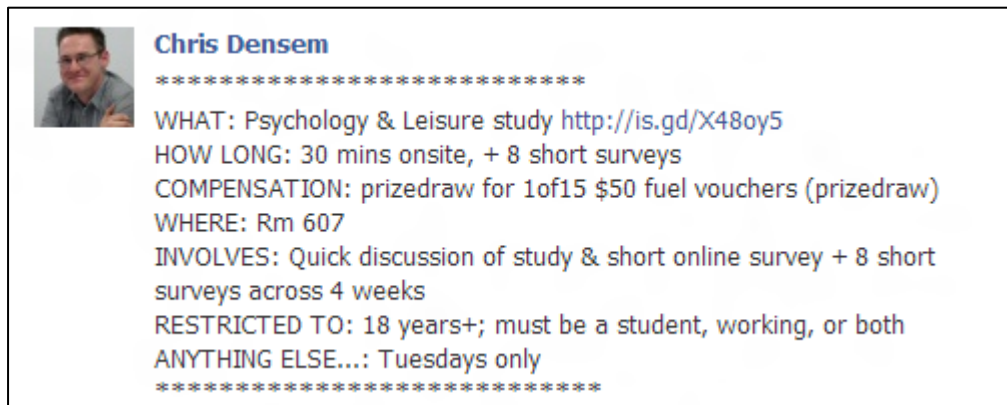


Figure B1. Version 1 of the Facebook® post used to recruit participants.

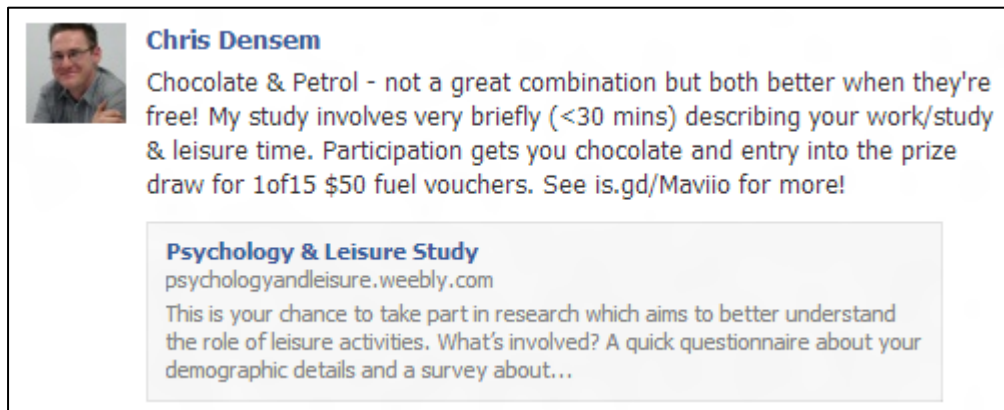


Figure B2. Version 2 of the Facebook® post used to recruit participants.



Figure B3. Version 3 of the Facebook® post used to recruit participants.

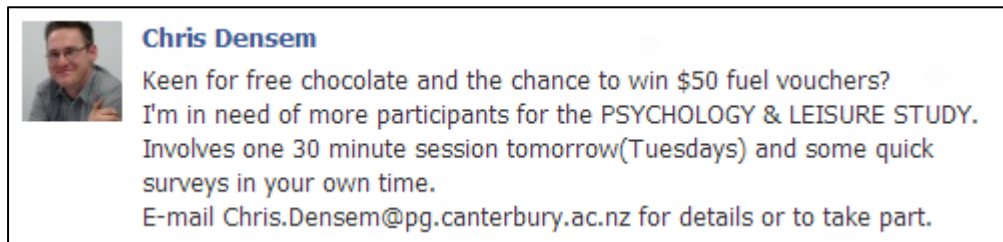
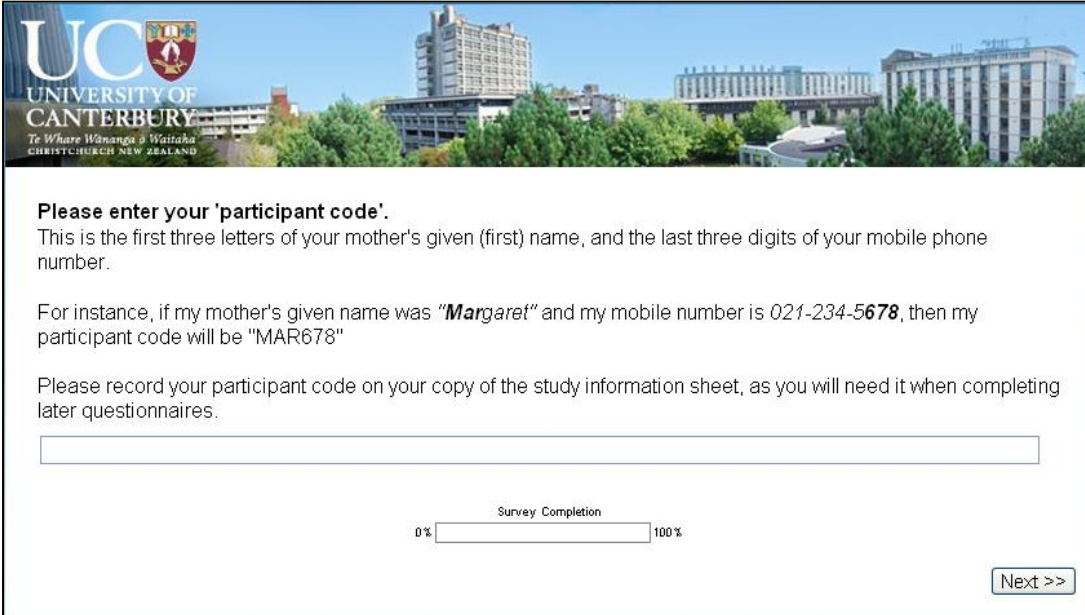


Figure B4. Version 4 of the Facebook® post used to recruitment participants.

Title *	Psychology and Leisure Study
Details *	<p>Chocolate & Petrol - not a great combination but both better when they're free! The Psychology and Leisure study involves very briefly describing your work/study & leisure time. Participation earns you chocolate and entry into the prize draw for 1of15 \$50 fuel vouchers. For more details see www.psychologyandleisure.weebly.com</p> <p>Enter the main information for your post.</p>
Contact *	<p>Chris Densem</p> <p>The name of the person to contact regarding this post.</p>
Contact Details *	<p>Chris.Densem@pg.canterbury.ac.nz</p> <p>Enter how to contact the person (i.e. Email/Phone/Mobile etc.) along with details.</p>
Show From *	<p>11/09/2012</p> <p>Enter the date to show this post FROM.</p>

Figure B5. Message placed on CDHB intranet to recruit participants.

Appendix C – Screenshots of Baseline Survey Pages



Please enter your 'participant code'.
This is the first three letters of your mother's given (first) name, and the last three digits of your mobile phone number.

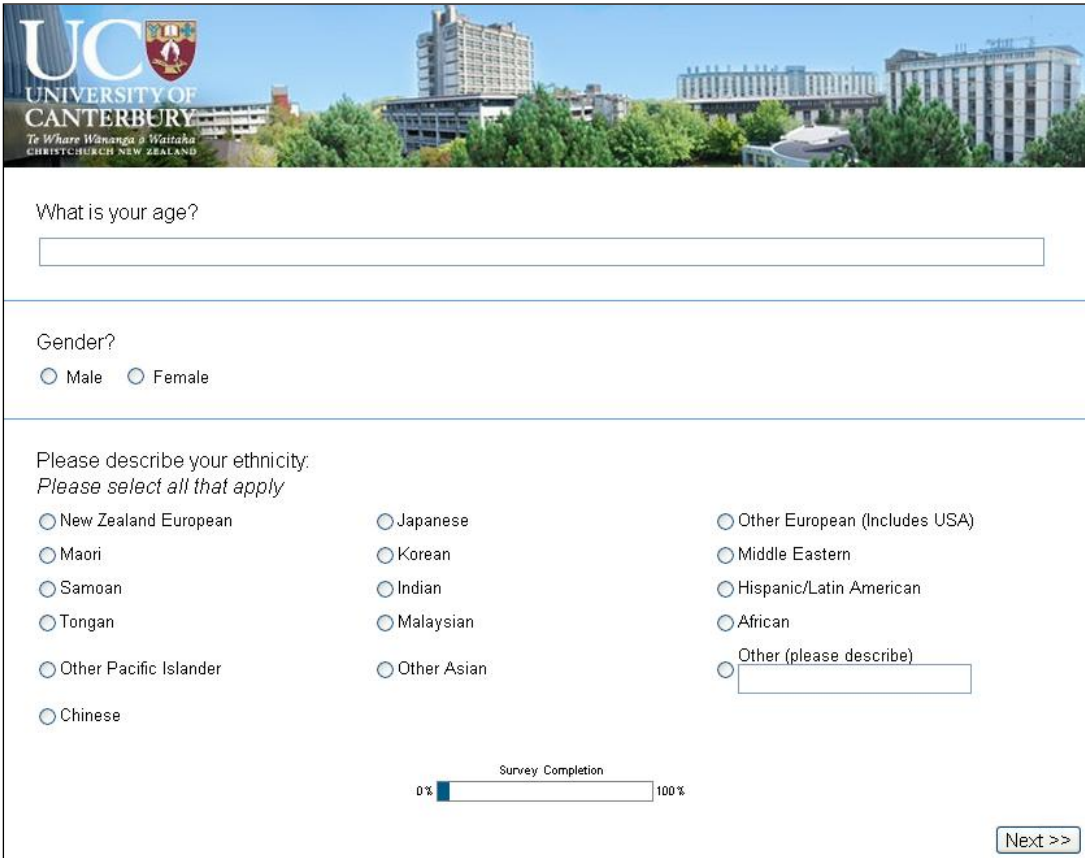
For instance, if my mother's given name was "**Margaret**" and my mobile number is **021-234-5678**, then my participant code will be "MAR678"

Please record your participant code on your copy of the study information sheet, as you will need it when completing later questionnaires.

Survey Completion
0% 100%

Next >>

Figure C1. Page 1 of baseline survey.



What is your age?

Gender?
☐ Male ☐ Female


Please describe your ethnicity:
Please select all that apply

☐ New Zealand European ☐ Japanese ☐ Other European (Includes USA)
☐ Maori ☐ Korean ☐ Middle Eastern
☐ Samoan ☐ Indian ☐ Hispanic/Latin American
☐ Tongan ☐ Malaysian ☐ African
☐ Other Pacific Islander ☐ Other Asian ☐ Other (please describe)
☐ Chinese

Survey Completion
0% 100%

Next >>

Figure C2. Page 2 of baseline survey, which asks for participant age, gender, and ethnicity.



How would you describe your current living arrangements?

☐ Live with others ☐ Live by yourself

How would you describe your current relationship status?

☐ Single ☐ In a relationship

How would you describe the overall quality of your **social** relationships in general over the past **four weeks**?

(1) Turbulent or Stressful (100) Ideal


0 10 20 30 40 50 60 70 80 90 100

50

Survey Completion 0% 100%

Next >>

Figure C3. Page 3 of baseline survey, which asks about the participant's living arrangements, relationship status, and the quality of their social relationships.



If you are in paid employment please enter your job title:
Please do not abbreviate.

If you are a tertiary student (e.g., attending a University or Polytechnic), please indicate whether you are part-time or full-time.

Not a student Study part-time (EFTS of 0.79 or lower) Study full-time (EFTS of 0.8 or greater)

☐ ☒ ☒

At what level are you currently studying?



Undergraduate/Preparation Honors/Postgraduate Diploma Masters PhD/Doctorate

☐ ☐ ☐ ☐

Survey Completion 0% 100%

Next >>

Figure C4. Page 4 of baseline survey, which asks for the participant's job title, tertiary enrolment status, and level of study (if enrolled).

Over the **past four weeks**, on which days were you typically involved in **paid employment**?

Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday ☐ Don't have a paid job ☐

Over the **past four weeks**, on which days were you typically involved in **study**?

Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday ☐ None of These ☐

Thinking only of the **past four weeks**, please indicate the approximate amount of time **per week** that you were involved in each of the following activities:

For the purpose of this study, '**leisure**' is anything you do that is not a part of your studies or paid employment.

Please enter your responses as *hours*.

Employment (paid)
 Study
 Leisure
 Sleep

Activities often involve particular types of demands, and many activities are demanding in more than one way.

For Example, a Detective worked 8 hours yesterday: 6 of these hours involved mentally demanding work, 3 hours were physically demanding, and all 8 of these hours entailed emotional demands. Notice that the sum of these demands (6+3+8=17) is greater than 8 - this is fine since activities might be demanding in more than one way.

Thinking only of the **past four weeks**, how many hours **per week** did you spend engaged in activities which you would characterise as being...(remember, an activity can involve more than one type of demand)

(If any of the categories do not apply to you please enter a zero into the relevant boxes)


	Mentally demanding	Physically demanding	Emotionally demanding
Employment (paid)	<input type="text"/> hours	<input type="text"/> hours	<input type="text"/> hours
Study	<input type="text"/> hours	<input type="text"/> hours	<input type="text"/> hours
Leisure	<input type="text"/> hours	<input type="text"/> hours	<input type="text"/> hours

Survey Completion

0% 100%

Next >>

Figure C5. Page 5 of baseline survey, which concerns how the participant uses their time



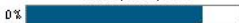
Thinking about any **leisure** time you've experienced during the **past four weeks**, please rate your agreement with the following statements.

During this time...

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I forgot about work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I didn't think about work and study at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I distanced myself from my work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I got a break from the demands of work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


Please consider the following statements in relation to how you *generally* feel. For each statement please indicate your agreement using the 7-point scale below:

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I often think about work or study related problems after waking up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I come home, it is easy for me to switch off from work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that those who are closest to me think I give too much of myself to my work or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can rarely let go of thoughts concerning my work or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the evenings when I am free I think about work or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My work or study is on my mind even on the weekends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Completion 0%  100%

Next >>

Figure C6. Page 6 of baseline survey, which includes detachment and overcommitment subscales.



We thank you for your time spent taking this survey.
Your response has been recorded.


Survey Completion 0%  100%

Figure C7. Page 7 of baseline survey, which thanks the participant for their time.

Appendix D – Screenshots of Diary Survey Pages

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Please enter your 'participant code'.
This is the first three letters of your mother's given (first) name, and the last three digits of your mobile phone number.

Please ensure that you enter the same code that you entered during the initial meeting with the researcher, and that you continue to use this code for the duration of the study.

For instance, if my mother's given name was "**Margaret**" and my mobile number is **021-234-5678**, then my participant code will be "MAR678".


At any time during this survey you can use the links at the bottom of the page to view copies of the Information Sheet, Consent Form and Study Guide. These links will open in a new browser window.

Survey Completion
0% 100%

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Figure D1. Page 1 of diary survey.



Thinking only of the **past 3 days**, please indicate approximately how many hours you spent engaged in the following activities:

Employment (paid)
 Study
 Leisure
 Sleep

Activities often involve particular types of demands, and many activities are demanding in more than one way.

For Example, a Detective worked 8 hours yesterday: 6 of these hours involved mentally demanding work, 3 hours were physically demanding, and all 8 of these hours entailed emotional demands. Notice that the sum of these demands (6+3+8=17) is greater than 8.

Thinking only of the **past 3 days**, approximately how many hours **in total** did you spend engaged in activities which you would characterise as being...(remember, an activity can involve more than one type of demand)

(If any of the categories do not apply to you please enter a zero into the relevant boxes)

	Mentally demanding	Physically demanding	Emotionally demanding
Employment (paid)	<input type="text" value="0"/> hours	<input type="text" value="0"/> hours	<input type="text" value="0"/> hours
Study	<input type="text" value="0"/> hours	<input type="text" value="0"/> hours	<input type="text" value="0"/> hours
Leisure	<input type="text" value="0"/> hours	<input type="text" value="0"/> hours	<input type="text" value="0"/> hours

At any point during the **past 3 days** were you sick or unwell?

☒ Yes
 ☐ No

Was your sickness severe enough that it **prevented** you from working or studying?


☐ Yes
 ☐ No, I was able to work/study
 ☐ No, but I wasn't planning to work/study

Survey Completion: %

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Figure D2. Page 2 of diary survey which asks participant about their time use during the last three days, and whether they were unwell.




Work & Study Activities

Considering only the activities you engaged in during **work or study-time** over the **last 3 days**, please rate each of the following demands associated with these activities, as YOU experienced them:

The **work and study** activities I performed...


	Not At All		Occasionally			Frequently	
Required considerable physical effort on my part	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involved sustained physical demands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physically taxed or strained me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required considerable mental effort on my part	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involved sustained mental demands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mentally taxed or strained me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required me to conceal my thoughts and feelings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required me to display emotions which I did not genuinely feel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required me to carefully monitor and control my emotions when interacting with other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Completion
0%  100%

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Figure D3. Page 3 of diary survey, which includes the work and study activity demand items. This page was only displayed if, on the previous page, the participant indicated that they had spent at least one hour working during the past three days.



Leisure Activities

Considering only the activities you engaged in during **leisure time** over the **last 3 days**, please rate each of the following demands associated with these activities, as YOU experienced them:

The **leisure** activities I engaged in...

	Not at all			Occasionally			Frequently
Required considerable physical effort on my part	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involved sustained physical demands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physically taxed or strained me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required considerable mental effort on my part	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involved sustained mental demands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mentally taxed or strained me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required me to conceal my thoughts and feelings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required me to display emotions which I did not genuinely feel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required me to carefully monitor and control my emotions when interacting with other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


Survey Completion

0%

100%

Next >>

Figure D4. Page 4 of the diary survey, which includes the leisure activity demand items.




Thinking about any **leisure time** you've experienced during the **past 3 days**, please rate your agreement with the following statements.

During this time...

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I forgot about work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I didn't think about work and study at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I distanced myself from my work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I got a break from the demands of work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please consider the following statements in relation to how you have felt during the **past 3 days**. For each statement please indicate your agreement using the 7-point scale below.


	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I often thought about work or study related problems after waking up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I came home, it was easy for me to switch off from work and study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that those who are closest to me would think I gave too much of myself to my work or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I could rarely let go of thoughts concerning my work or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the evenings when I was free I thought about work or study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work or study was on my mind even during my time off	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Completion: 0%  100%

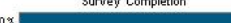
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Figure D5. Page 5 of the diary survey, which includes detachment and overcommitment subscales.



We thank you for your time spent taking this survey.
Your response has been recorded.

Survey Completion: 0%  100%

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Figure D6. Page 6 of the diary survey, which thanks the participant for their time.

Appendix E – Activity Demand Items

Work and study activity demand items.

The work and study activities I performed...

- Required considerable physical effort on my part
- Involved sustained physical demands
- Physically taxed or strained me
- Required considerable mental effort on my part
- Involved sustained mental demands
- Mentally taxed or strained me
- Required me to conceal my thoughts and feelings
- Required me to display emotions which I did not genuinely feel
- Required me to carefully monitor and control my emotions when interacting with other people

Table E1

Structure matrix for work and study activity demand items following principle axis factoring and oblique rotation.

Item	Diary 1			Diary 2			Diary 3			Diary 4			Diary 5			Diary 6			Diary 7			Diary 8		
	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot
ActDem01	.89		.43	.80			.85		.44	.92			.94			.83			.86			.80	.43	
ActDem02	.99			.99			1.00		.42	.92			.96			.95			.78			1.00	.42	
ActDem03	.72			.84			.79			.79			.85			.83			.86			.82	.43	
ActDem04		.95			.95			.94			.75			.91	.43		.95			.95		.42	.91	
ActDem05		.95			.97			.98			.99			.92			.99			.98		.47	.96	
ActDem06		.92			.89	.40		.93			.84			.91	.57		.88			.88		.47	.89	
ActDem07			.86		.42	.84	.41		.92			.94		.42	.95			.93		.40	.94			.97
ActDem08			.83			.92	.41		.94			.93		.43	.98			1.00			.98			.95
ActDem09			.85			.94	.42	.47	.86			.91		.47	.91			.90			.96			.96
Eigenvalues	2.68	2.98	1.49	2.44	3.46	1.55	2.81	3.30	1.46	2.33	3.25	1.67	3.90	2.62	1.30	3.29	2.45	1.89	3.79	1.79	2.06	2.84	2.96	1.85
% Variance Reproduced		79.39			82.81			84.09			80.53			86.94			84.71			84.85			84.97	
Bartlett's χ^2 ^a		327.3			363.22			405.13			249.04			364.08			331.71			365.53			335.95	
KMO		.72			.73			.71			.67			.76			.70			.70			.73	

Note. Factor loadings less than .400 are not displayed. Strongest factor loadings are emboldened. 'Phys'=Physical demand items, 'Ment'=Mental demand items, 'Emot'=Emotional demand items. ^aAll χ^2 are on 36 degrees of freedom and have $p < .001$.

Table E2

Bivariate correlations between work and study activity demand factors.

Factor	Diary 1			Diary 2			Diary 3			Diary 4			Diary 5			Diary 6			Diary 7			Diary 8		
	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot
Phys		.36*	-.10		-.03	.33*		.04	.45*		.08	.17		-.08	.28		.32*	.29		.17	.02		.49**	.18
Ment	.36*		.24	-.03		.38*	.04		.38*	.08		.30	-.08		.45*	.32*		.34*	.17		.35*	.49**		.27
Emot	-.10	.24		.33*	.38*		.45*	.38*		.17	.30		.28	.45*		.29	.34*		.02	.35*		.18	.27	

* $p < .05$. *Note.* 'Phys'=Physical demand subscale, 'Ment'=Mental demand subscale, 'Emot'=Emotional demand subscale.

Leisure activity demand items.

The leisure activities I engaged in...

- Required considerable physical effort on my part
- Involved sustained physical demands
- Physically taxed or strained me
- Required considerable mental effort on my part
- Involved sustained mental demands
- Mentally taxed or strained me
- Required me to conceal my thoughts and feelings
- Required me to display emotions which I did not genuinely feel
- Required me to carefully monitor and control my emotions when interacting with other people

Table E3

Structure matrix for leisure activity demand items following principle axis factoring and oblique rotation.

Item	Diary 1			Diary 2			Diary 3			Diary 4			Diary 5			Diary 6			Diary 7			Diary 8		
	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot
ActDem01	.91						.93			.94			.927			.96	.48		.86			.85		.40
ActDem02	.96						.92			.98			.988			.99	.45		1.00			.92		
ActDem03	.90						.86			.80			.924	-.47		.93	.45		.87			.84		
ActDem04	.46	-.82						.90	.66	.42	.85			-.89	.49		.87	.48	.42	.89			-.94	.54
ActDem05		-.95						.93	.52		.98			-.97			.99	.58		.97			-.96	.56
ActDem06		-.90						.82	.59		.93			-.91	.53		.74	.52		.70			-.90	.49
ActDem07		-.43	.92					.60	.94			.95			.96		.54	.93			.86		-.49	.96
ActDem08			.89					.52	.88			.89		-.41	.93		.55	.98			.87		-.56	.95
ActDem09			.93					.65	.93			.95		-.45	.95		.55	.87		.43	.95		-.63	.94
Eigenvalues	3.80	2.43	1.31				4.64	1.98	0.81	3.99	1.81	1.90	3.87	2.82	1.36	3.63	2.57	1.58	2.80	3.09	1.31	4.83	1.25	1.58
% Variance Reproduced		83.80						82.28			85.59			89.50			86.38			80.02			85.04	
Bartlett's χ^2 ^a		402.31				452.36		378.4			403.12			434.23			462.76			298.88			410.52	
KMO		.73				.69		.83			.73			.76			.77			.71			.74	

Note. Factor loadings less than .400 are not displayed. Strongest factor loadings are emboldened. 'Phys'=Physical demand items, 'Ment'=Mental demand items, 'Emot'=Emotional demand items. ^aAll χ^2 are on 36 degrees of freedom and have $p < .001$.

Table E4

Bivariate correlations between leisure activity demand factors.

Factor	Diary 1			Diary 2			Diary 3			Diary 4			Diary 5			Diary 6			Diary 7			Diary 8		
	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot	Phys	Ment	Emot
Phys		.06	-.30*					.29*	.62*		.29	.34*		-.01	-.36*		.48*	.58*		.29	-.12		-.56*	.41
Ment	.06		-.35*				.29*		.27	.29		.28	-.01		-.41*	.48*		.09	.29		.38*	-.56*		-.32*
Emot	-.30*	-.35*					.62*	.27		.34*	.28		-.36*	-.41*		.58*	.09		-.12	.38*		.41*	-.32*	

* $p < .05$ *Note.* 'Phys'=Physical demand subscale, 'Ment'=Mental demand subscale, 'Emot'=Emotional demand subscale.

Appendix F –Psychological Detachment Items

Table F1

Original and reworded psychological detachment items

Original REQ Item Wording	New Item Wording for Baseline and Diary Surveys
I forgot about work.	I forgot about work and study
I don't think about work at all.	I didn't think about work and study at all
I distance myself from my work.	I distanced myself from my work and study
I get a break from the demands of work.	I got a break from the demands of work and study

Note. All item ratings performed using a 5-point Likert scale for the Recovery Experience Questionnaire (REQ), and a 7-point scale for the current study. Original items are from Sonnentag and Fritz (2007).

Table F2

Factor loadings of detachment items on single detachment factor.

	Baseline	Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6	Diary 7	Diary 8
PDet01	.861	.594	.999	.818	.913	.963	.966	.704	.945
PDet02	.891	.670	.875	.760	.957	.928	.899	.673	.941
PDet03	.804	.981	.710	.902	.684	.701	.563	.918	.802
PDet04	.622	.869	.647	.895	.728	.566	.503	.893	.731
Eigenvalues	2.57	2.52	2.69	2.86	2.75	2.60	2.31	2.59	2.96
% Variance Reproduced	64.20	62.97	67.19	71.55	68.68	64.96	57.79	64.68	73.86
Bartlett's χ^2 ^a	110.57	124.43	138.60	135.50	128.40	132.20	107.93	114.56	153.88
KMO	.770	.677	.734	.797	.709	.687	.662	.709	.748

Note. Factors based upon maximum likelihood extraction

^aAll χ^2 are on 6 degrees of freedom, with $p < .001$

Appendix G – Overcommitment Items

Table G1

Original and reworded overcommitment items

Original Item Wording	New Item Wording	
	Baseline Survey Items	Diary Survey Items
It often occurs that I wake up in the morning and think about work related problems	I often think about work or study related problems after waking up	I often thought about work or study related problems after waking up
When I come home, it is easy for me to switch off from work	When I come home, it is easy for me to switch off from work and study	When I came home, it was easy for me to switch off from work and study
Those who are close to me say I give too much of myself to my work	I believe that those who are closest to me think I give too much of myself to my work or study	I believe that those who are closest to me would think I gave too much of myself to my work or study
I can rarely let go of thoughts concerning my work	I can rarely let go of thoughts concerning my work or study	I could rarely let go of thoughts concerning my work or study
Even in the evenings when I am free I think about work	In the evenings when I am free I think about work or study	In the evenings when I was free I thought about work or study
My work is on my mind even on the week-ends	My work or study is on my mind even on the weekends	Work or study was on my mind even during my time off

Note. Original item ratings were performed using a 5-point Likert scale, while the current study (i.e., ‘new items’) used a 7-point scale, and 2 is reverse coded in all instances. Original items are from Näswall, Baraldi, Richter, Hellgren & Sverke (2006).

Table G2

Factor loadings of overcommitment items on single overcommitment factor.

	Baseline	Diary 1	Diary 2	Diary 3	Diary 4	Diary 5	Diary 6	Diary 7	Diary 8
Ovc01	.714	.711	.855	.751	.818	.818	.783	.838	.947
Ovc02 (R)	.698	.641	.772	.584	.680	.680			.785
Ovc03	.448	.420	.490	.449					
Ovc04	.832	.849	.873	.904	.820	.820	.744	.883	.869
Ovc05	.767	.867	.831	.810	.801	.801	.924	.963	.831
Ovc06	.803	.870	.931	.930	.864	.864	.940	.981	.962
Eigenvalues	3.12	3.32	3.89	3.45	3.29	3.56	3.07	3.57	3.99
% Variance Reproduced	52.05	55.36	64.81	57.42	54.89	59.75	51.09	59.43	66.51
Bartlett's χ^2 ^a	133.06	145.47	214.12	173.74	146.57	171.44	140.20	203.27	220.65
KMO	.811	.846	.878	.846	.805	.839	.803	.837	.852

Note. Factors based upon maximum likelihood extraction. Loadings less than 0.400 are not displayed. (R) denotes the particular item is reverse-coded. ^aAll χ^2 are on 15 degrees of freedom, with $p < .001$

Appendix H – E-mail Sent in Reply to Participant Inquiries

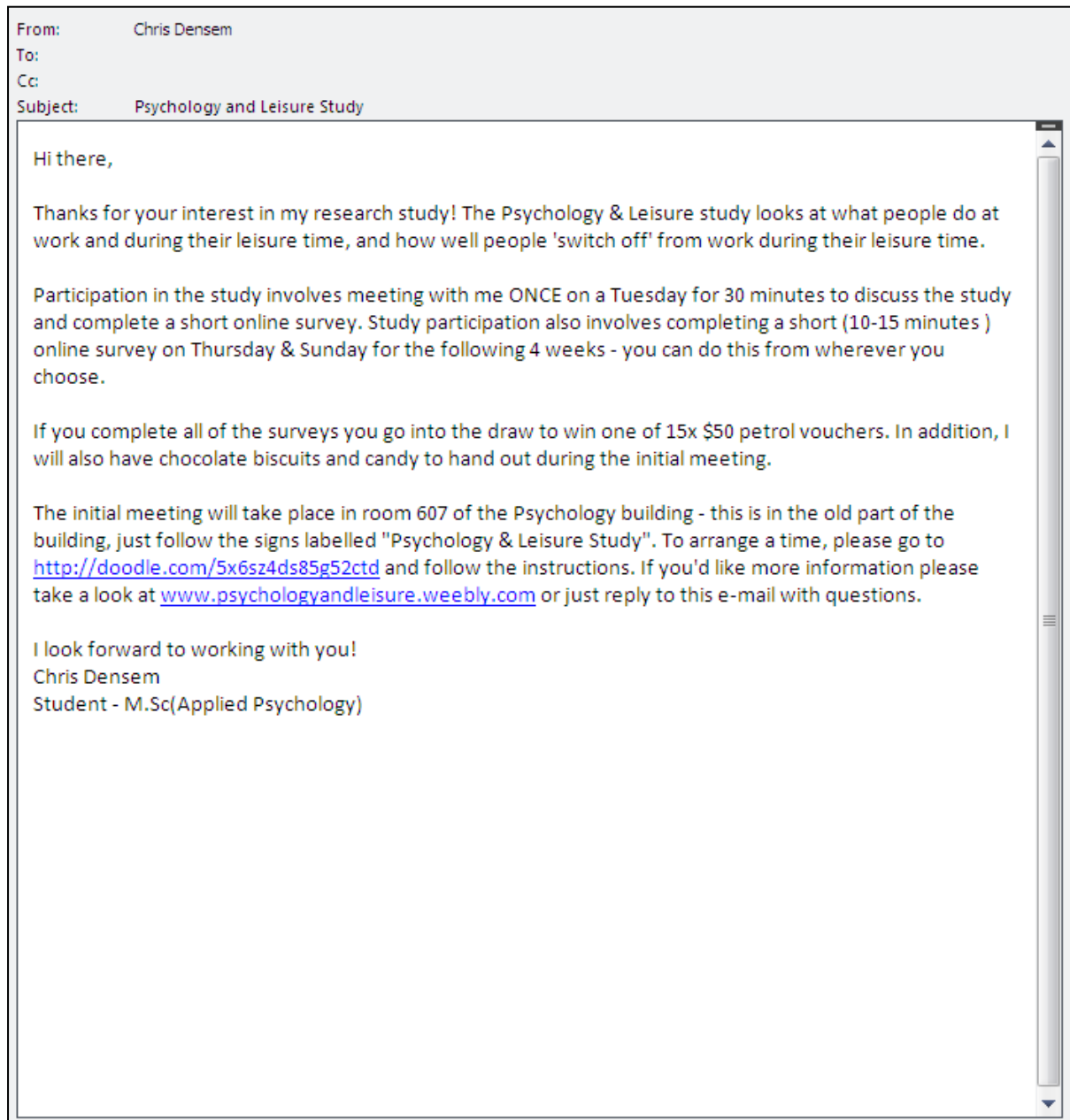


Figure H1. Contents of e-mail sent to participants in response to their initial inquiry.

Appendix I – Participant Information Sheet

Telephone: +64 3 364 2987 ext 7187
Email: Chris.Densem@pg.canterbury.ac.nz

Wednesday, August 8th, 2012



Information Sheet for Participants

If you agree to take part, your involvement in this project will require you to:

- Meet once with the researcher to learn more about the study and to complete a questionnaire which requires you to provide demographic details and complete 10 short questions intended to examine your leisure activities.
This session will take approximately 30 minutes, including the questionnaire
- Complete a repeated questionnaire in which you indicate the types of activities in which you've engaged during work and non-work times. You will be required to rate the physical, mental and emotional demands you experienced while performing these activities.
This questionnaire is expected to take approximately 10-15 minutes to complete, and will need to be completed every Thursday and Sunday for four consecutive weeks

Please note that participation in this study is voluntary. If you choose to participate you retain the right to withdraw from the project at any time, including the withdrawal of any information you have provided. This study has been approved by the University of Canterbury's Human Ethics committee.

The data you provide will be confidential, with your questionnaires being identified only by a 'participant code' which you will create. Particular care will be taken to ensure the confidentiality and security of all data gathered for this study, with all data being securely stored in password protected facilities and locked storage at the University of Canterbury. The dissertation project for which the data is being gathered, and any subsequent publications, will only describe data at the group-level and the identification of individual participants will not be possible.

To thank you for your time, effort and commitment, completion of all questionnaires entitles you to enter into the prize-draw for one of 15 \$50 petrol vouchers, and to receive a personalised summary of the information you have supplied.

As this study requires you to consider your work and leisure activities, this study involves a small risk of causing you stress and fatigue. Should this occur there are a number of resources available to help you, including:

- Lifeline New Zealand offers free phone-based counselling and support and can be found at 0800-543-354 or www.lifeline.co.nz
- The New Zealand Association of Counsellors provides a Counsellor Search tool which enables you to find counselling services and is accessible at <http://www.nzac.org.nz/>
- The University of Canterbury's Health Centre offers discounted counselling services to students and staff of the University and can be found at (03)-364-2402 or <http://www.canterbury.ac.nz/healthcentre/>

If you have any questions about the study, please don't hesitate to contact the researcher, Chris Densem (Chris.Densem@pg.canterbury.ac.nz) or (03)-364-2987 ext7187) or the research supervisors, Associate Professor Chris Burt (Christopher.Burt@canterbury.ac.nz) and Dr Katharina Näswall (Katharina.Naswall@canterbury.ac.nz). If you have any complaints about the study, you may contact the chair of the Human Ethics committee (human-ethics@canterbury.ac.nz).

Thank you sincerely for your time, I look forward to working with you.

Chris Densem
Student – M.Sc (Applied Psychology)
Department of Psychology, University of Canterbury

Your participant code:

Appendix J – Study Information and Recruitment Website

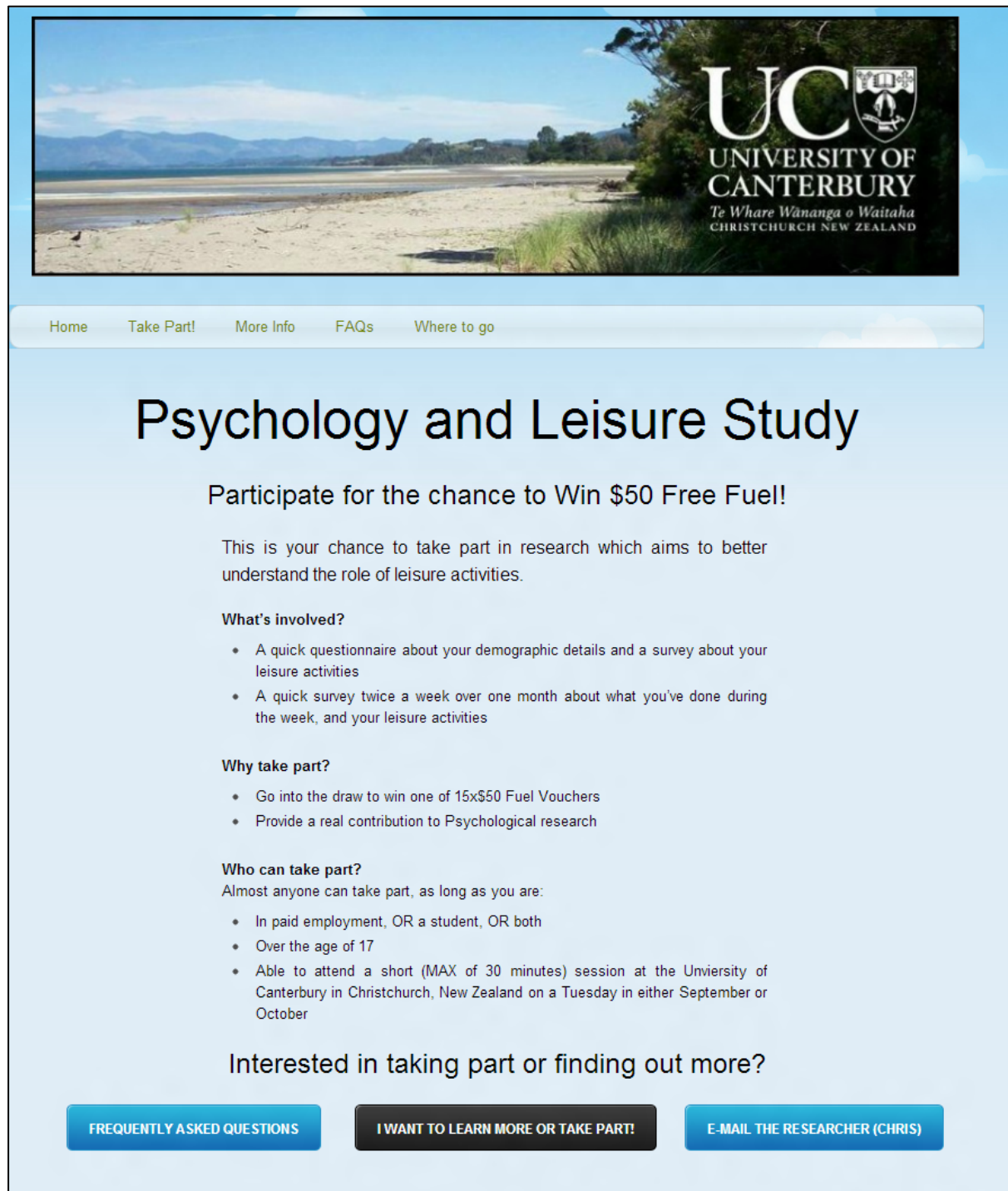



Figure J1. Landing ('home') page of study information website.



Home Take Part! More Info FAQs Where to go

Psychology and Leisure Study

Some information about the study:

Thanks for your interest in my research study! The Psychology & Leisure study looks at what people do at work and during their leisure time, and how well people 'switch off from work during their leisure time.

Participation in the study involves meeting with me ONCE on a Tuesday for 30 minutes to discuss the study and complete a short online survey. I realise that you might be away over the mid-term break, so there are also sessions in the first two weeks of next term. Study participation also involves completing a short (10-15 minutes) online survey on Thursday & Sunday for the following 4 weeks - you can do this from wherever you choose.

If you complete all of the surveys you go into the draw to win one of 15x \$50 petrol vouchers. In addition, I will also have chocolate biscuits and candy to hand out during the initial meeting.

The initial meeting will take place in room 607 of the Psychology building - this is in the old part of the building, just follow the signs labelled "Psychology & Leisure Study". To arrange a time, please [click here](#) and follow the instructions (link opens in new window).

This study has been reviewed and approved by the University of Canterbury's Human Ethics Committee (Ref#: HEC 2012/96).

If you'd like to e-mail me with questions or queries, please [click here](#).

I look forward to working with you!

- Chris Densem
Student - M.Sc(Applied Psychology)

[I JUST WANT TO TAKE PART!](#)

[FREQUENTLY ASKED QUESTIONS](#)

Figure J2. Study information website's "more information" page.



[Home](#)
[Take Part!](#)
[More Info](#)
[FAQs](#)
[Where to go](#)

Psychology and Leisure Study

Frequently Asked Questions:

1. [Why are you conducting this study?](#)
2. [Why is leisure worth studying?](#)
3. [How hard are the surveys?](#)
4. [Does this research have any sort of ethics approval?](#)
5. [Will people be able to find out what I wrote?](#)
6. [I'm not a student at the University, can I still participate?](#)
7. [How do I get to where the study is being conducted? \(Psychology room 607\)](#)
8. [Do I have to keep coming in to meet with the researcher?](#)
9. [Can I receive a summary of my results at the end of the study?](#)
10. [I have a smartphone, can I complete the surveys from this?](#)

[I ALREADY WANT TO TAKE PART!](#)

[LOOKING FOR MORE INFORMATION?](#)

Why are you conducting this study?

This study is being conducted in order to gather data for a dissertation project I'm conducting as part of my Master of Science in Applied Psychology.

[\(back up to the questions\)](#)

Why is leisure worth studying?

Applied Psychologists (particularly Industrial-Organisational Psychologists - what I'm hoping to become) often study people in the workplace, helping to understand what motivates them, satisfies them, and lets them survive the rigours and demands of work. Many pieces of applied psychological research have identified the crucial role played by leisure activities in ensuring that individuals in the workplace are happy, healthy, high-performing employees.

I've been a student for quite a few years, during which I've worked quite a bit. So I know from my own experience how important leisure is for avoiding misery, insanity, and a dependence on bad food and even worse things! Often, given the many demands of work, study and family, we find ourselves sacrificing leisure activities, or getting involved with different leisure activities, and I'd really like to develop a better understanding of how this might affect people.

[\(back up to the questions\)](#)

Does this research have any sort of ethics approval?
 Yes - this study has been reviewed and has full-ethics approval from the University of Canterbury's Human Ethics Committee (Ref#: HEC 2012/96).
[\(back up to the questions\)](#)

Will people be able to find out what I wrote?
 No - any information provided for the study is kept highly confidential through the use of a 'participant code' which you create. Only yourself and the researcher (me - Chris) will know who each code belongs to, and the researcher is bound by an agreement with the University of Canterbury Human Ethics Committee to not disclose this information.

Also, the final dissertation write-up and any publications based upon this data (academic journals) will never identify individual participants, and will only ever refer to participants at the group level.
[\(back up to the questions\)](#)

I'm not a student at the University, can I still participate?
 Absolutely! The only restrictions are that you are (1) at least 18 years of age; (2) either a student, have a paid job, or both; (3) able to be in Christchurch for one of the Tuesday induction sessions of no more than 30 minutes.
[\(back up to the questions\)](#)

How do I get to where the study is being conducted? (Psychology room 607)
 There's a page [here](#) which has a map and directions. But if you're still unsure after reading this then please feel free to [e-mail me](#) and ask.
[\(back up to the questions\)](#)

Do I have to keep coming in to meet with the researcher?
 No - you only have to meet with the researcher (me - Chris) once for a maximum of 30 minutes. Then you can complete the rest of the study from anywhere that has an internet connection.

Right now there's even a participant completing the study via mobile internet while in 'the middle of nowhere'
[\(back up to the questions\)](#)

Can I receive a summary of my results at the end of the study?
 Definitely! For ethical reasons (namely that I'm not a counsellor) I'm not able to offer interpretations of the data you provide, however I am more than happy to provide you with a nicely summarised table, and hopefully some diagrams which might prove interesting.
[\(back up to the questions\)](#)

I have a smartphone or tablet, can I complete the surveys from this?
 Yes, you can - though you still need to meet with the researcher (Chris) in person at the start of the study.


Provided that your smartphone is either an iPhone or Android device, or that your Tablet is an iPad, or is Android or Windows-based then your device is fully compatible with the survey!

Unfortunately Blackberry devices don't seem to work very well with the survey.
[\(back up to the questions\)](#)

I'D LIKE TO TAKE PART IN THE STUDY

LOOKING FOR MORE INFORMATION?

Figure J3. Study information website's "more information" page.



[Home](#)
[Take Part!](#)
[More Info](#)
[FAQs](#)
[Where to go](#)

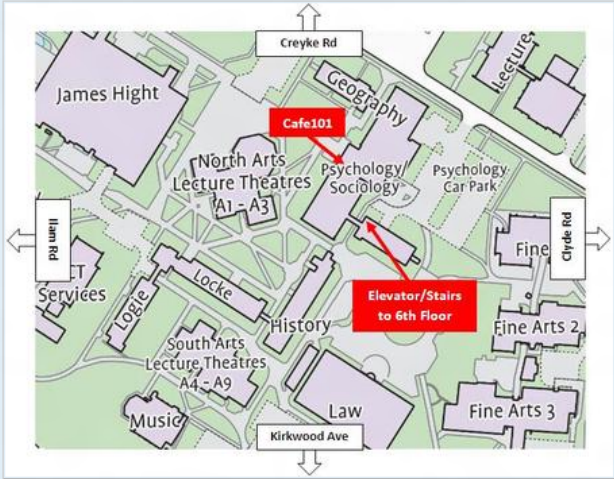
Psychology and Leisure Study

Where to go for the induction session:

One of the first steps in the Psychology and Leisure study requires that you come and meet with the researcher (Chris) for no more than 30 minutes to discuss the study and complete the first survey.

You only need to attend one of these sessions, and they take place in **room 607** of the **Psychology building** at the University of Canterbury in Christchurch, New Zealand. The University campus is accessible via Ilam, Creyke, and Clyde roads with free 2-hour parking available on Ilam and Clyde roads, and paid parking available within the campus ([click here for a printable map of parking locations](#)).

Within the main campus, the Psychology building can be found on the map below (look for the red box with white writing). If you're somewhat familiar with the campus, the Psychology building is home to Cafe101. To help you find your way around there are also large free-standing maps placed at various points around the campus.



The Psychology building has two parts:

1. A newer section which houses Cafe101 (on the ground floor), most of the labs and seminar rooms, has 4 main floors and large externally mounted metal window-shades
2. An older section which contains mostly offices, is clad in concrete and has 7 floors.

Room 607 is on the 6th floor of the older section.

There are stairs and an elevator to this level housed in the north-east corner of the older section. You can reach these either by walking through the new section, or by doors which open directly into the corridor that connects the two sections - this is the skinny part of the building on the map.

If you find yourself on the 4th floor and unable to go any higher, this means you're still in the newer section. To help you find your way to room 607 just follow the signs which have the "beach and UC logo" banner which is also the heading of this website.

If you are unable to find your way, there are plenty of friendly staff and students around who should be able to help!

Figure J4. Study information website's "where to go" location information page.

Appendix K – Participant Consent Form

Telephone: +64 3 364 2987 ext 7187
Email: Chris.Densem@pg.canterbury.ac.nz



Wednesday, August 8th, 2012

Consent Form for Participants

By completing this form you agree that (please tick each box to indicate your agreement):

- ☐ The project has been fully explained to me, I have been given ample opportunity to ask questions, and any questions have been answered sufficiently.
- ☐ I understand what is required of me should you agree to take part in the research.
- ☐ I understand that my participation is voluntary and that I may withdraw from the project at any time without penalty or negative consequence.
- ☐ I understand that any information I provide will be confidential and that any published or reported results will not identify me.
- ☐ I understand that all data collected for the study will be kept secure and will be destroyed after ten years.
- ☐ I understand the risks associated with taking part in the study, and have been provided with contacts to seek in the unlikely event of detrimental outcomes.
- ☐ I understand that I am able to receive a report on the findings of the study and a summary of the data you provide.
- ☐ I understand that the project has been approved by the University of Canterbury's Human Ethics Committee, and that I may contact the Chair of the University of Canterbury's Human Ethics Committee if I have any complaints.
- ☐ I understand that I can contact the researcher (Chris Densem) or his supervisors (Associate Professor Chris Burt, and Dr Katharina Näswall) for further information about the study.

If you agree with the above statements, please complete the following:

Participant's name:

Participant's mobile #: Participant Code:

Participant's E-mail address:

Participant's signature: Today's date:

Consent forms must be completed and returned to the researcher during the initial meeting.

Thank you for volunteering to participate in this study!

Chris Densem
Student – M.Sc (Applied Psychology)
Department of Psychology, University of Canterbury

University of Canterbury Private Bag 4800, Christchurch 8140, New Zealand. www.canterbury.ac.nz

Appendix L – Survey Reminder Content

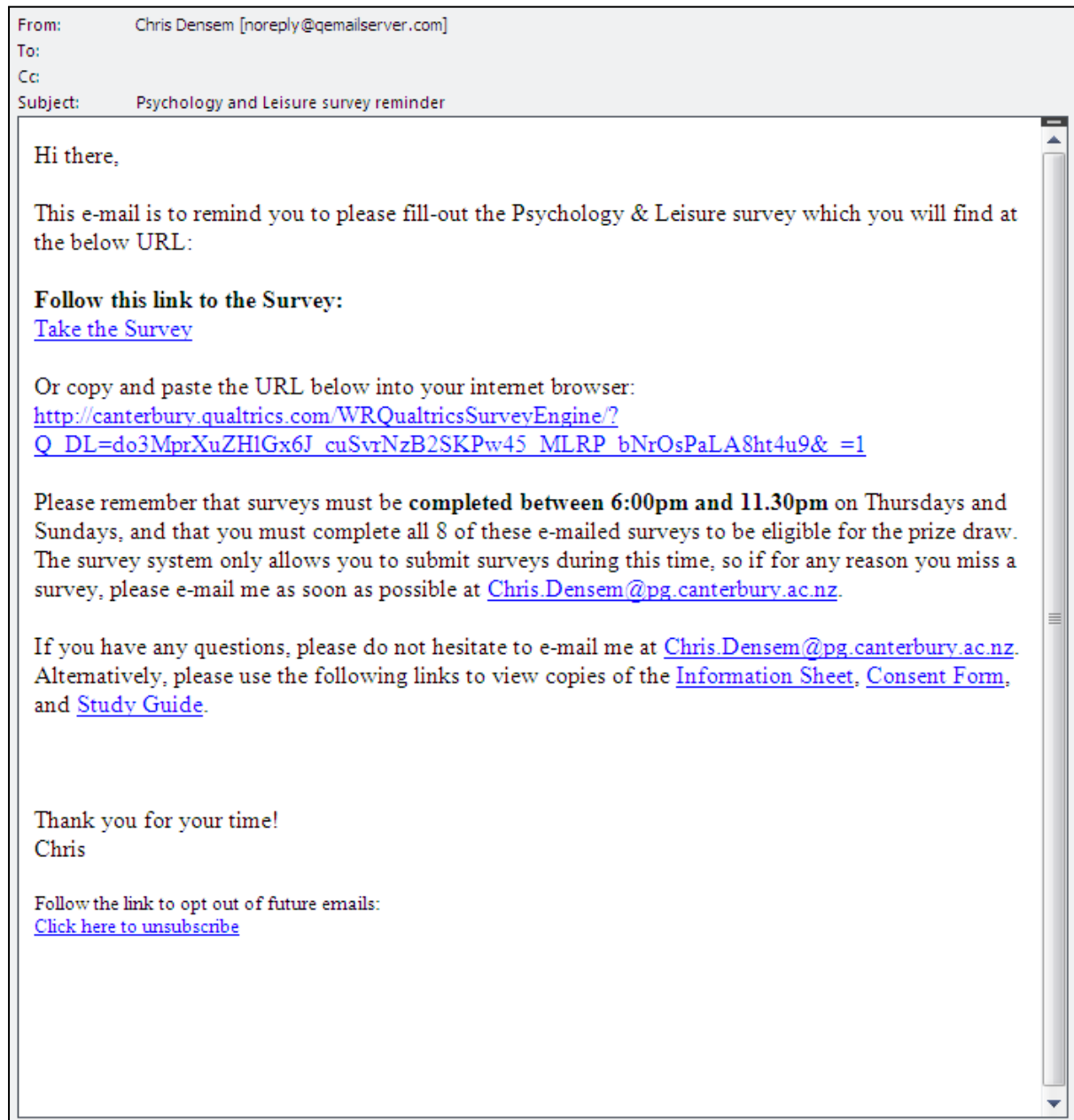


Figure L1. Content of e-mail sent to participants to notify them that a new survey is ready for their responses.

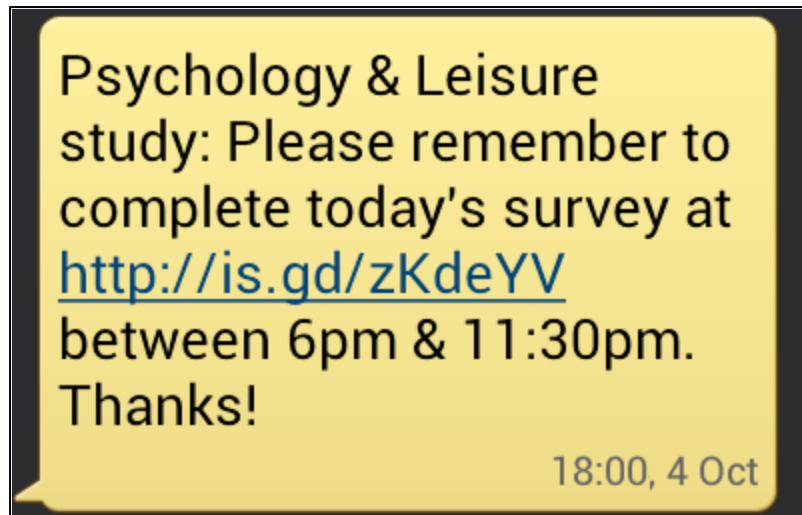


Figure L2. Content of SMS text message sent to participants to notify them that a new survey is ready for their responses, as viewed on a mobile phone running the Android 4.0.4 operating system.

Appendix M – Study Completion E-mail

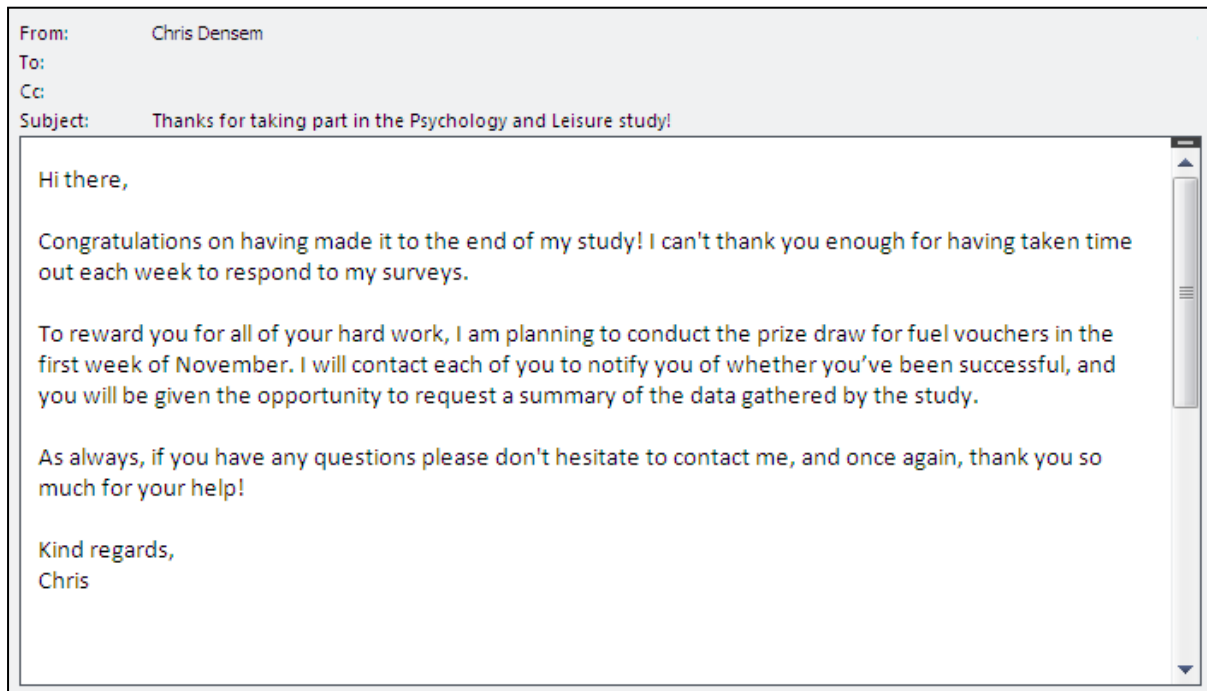


Figure M1. E-mail message sent to participants on the Monday morning following their eighth (i.e., final) diary survey.